THE FLIGHT OF THE SOUTHERN CROSS

C. E. KINGSFORD-SMITH

C. T. P. ULM

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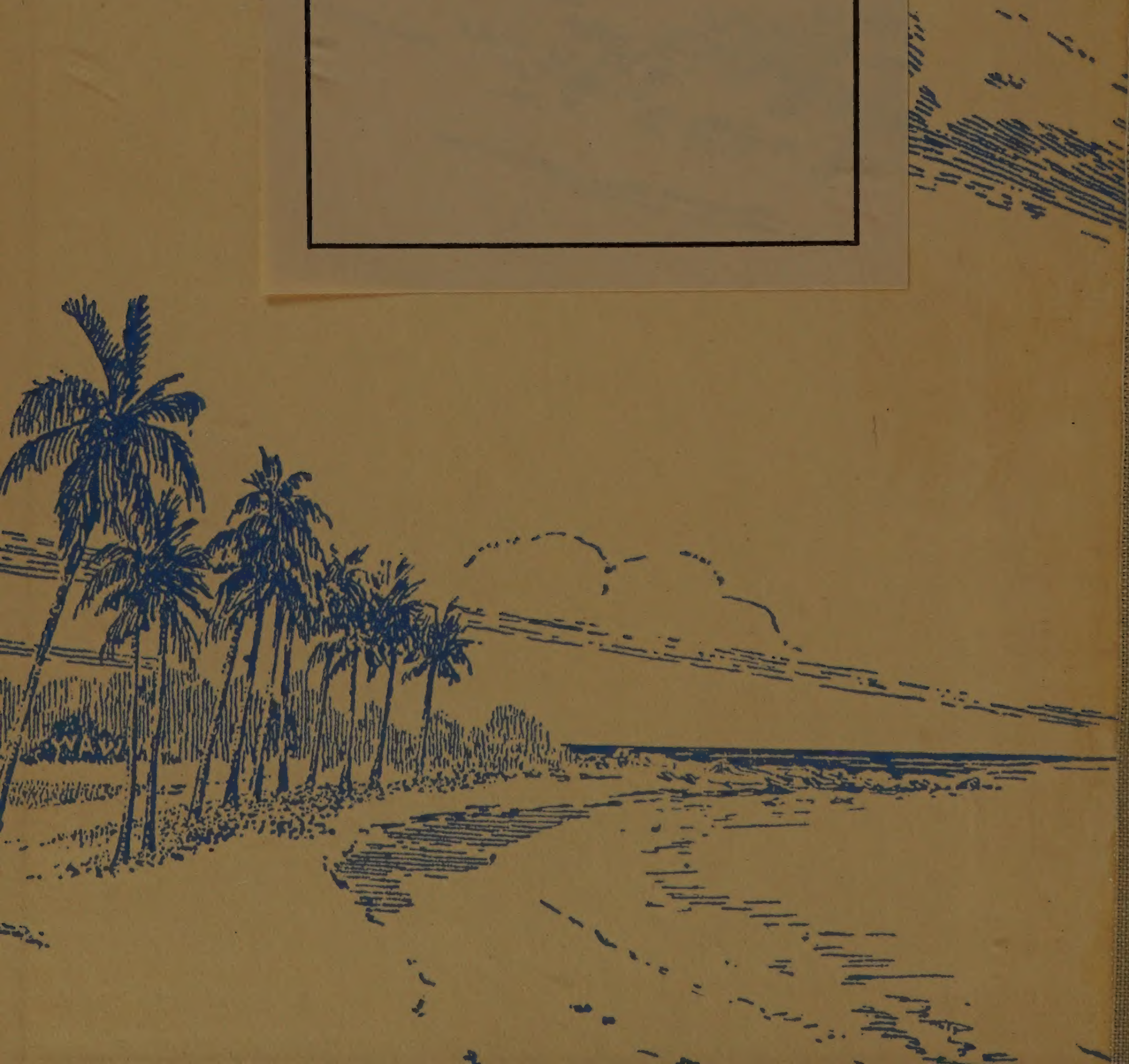

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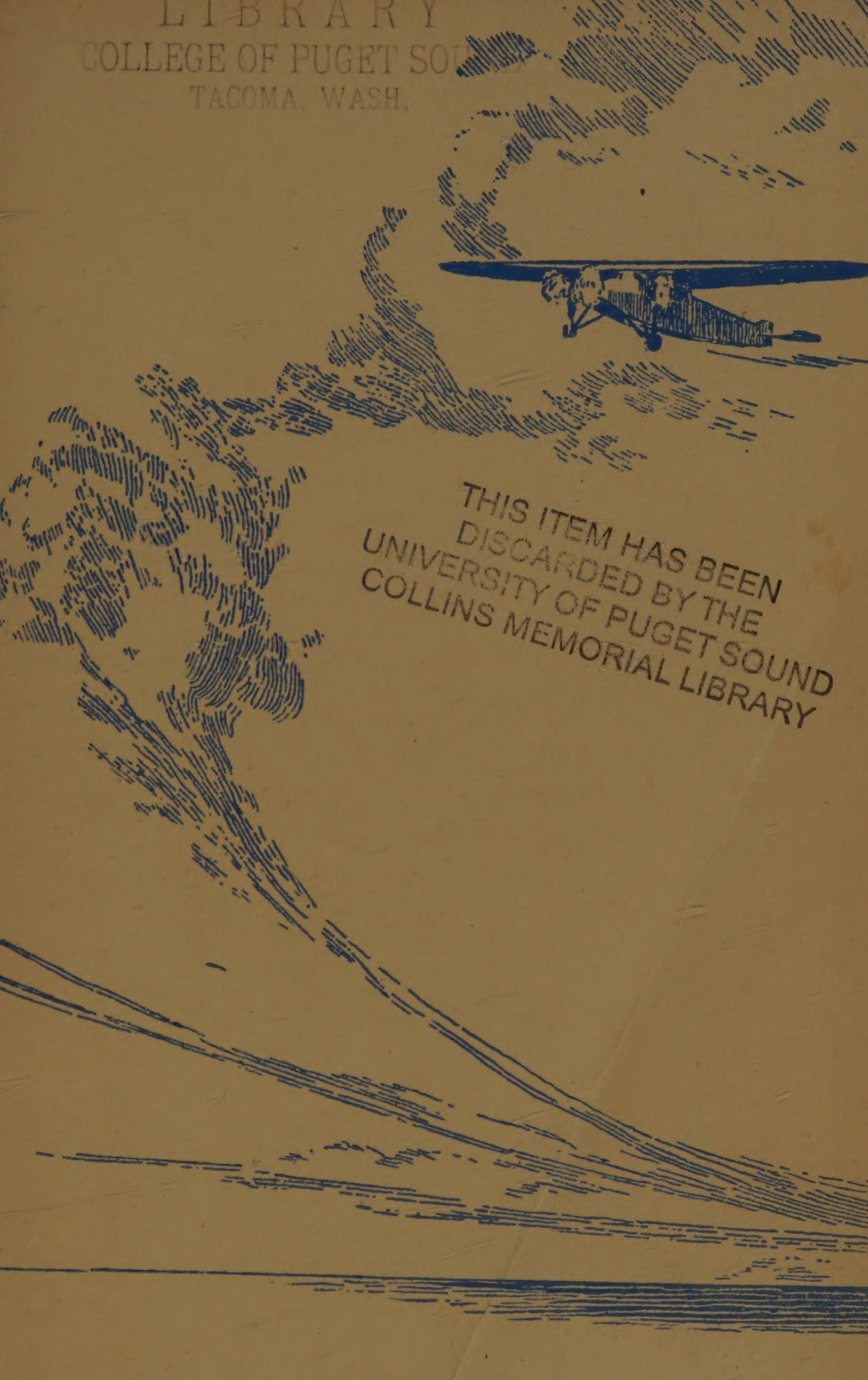

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The Flight of the Southern Cross

OUTWARD BOUND

The "Southern Cross" winging over the Golden Gate at the start of its epic flight over the Pacific to Australia.

The Flight of the Southern Cross

harles

BY

C. E. KINGSFORD-SMITH

m

AND

C. T. P. ULM

WITH A FOREWORD BY
HIS EXCELLENCY, THE RIGHT HONORABLE
LORD STONEHAVEN
P.C., G.C.M.G., D.S.O.
GOVERNOR-GENERAL OF AUSTRALIA

Illustrated

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TO THOSE OF OUR FRIENDS
WHO HAD FAITH

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FOREWORD

By His Excellency The Right Hon. LORD STONEHAVEN, P.C., G.C.M.G., D.S.O. Governor-General of Australia

No one living in Australia when Squadron-Leader Kingsford-Smith and his gallant Australian and American companions left San Francisco on their attempt to fly across the Pacific Ocean is likely to forget the anxious interest with which the radio messages announcing their progress were received, or the feeling of thankfulness and pride called forth by their success. A record of the incidents which marked the great adventure will be of general interest, but above all it cannot fail to be an invaluable guide to flying men.

For the feat was equally noteworthy on account of the boldness of its conception, the courage and skill of its execution and the careful preparation which preceded it. Nothing was neglected which foresight or experience could recommend.

It is appropriate that the first flight across the Pacific should have been accomplished by the collaboration of members of two great progressive communities which inhabit its shores. They have thereby not only increased the long list of victories won by Australians and Americans in the air, but have opened up a fresh avenue for the collaboration of their two nations in the interests of peace and commerce.

Stonehaven

Charleville,
Queensland,
11*th August,* 1928.

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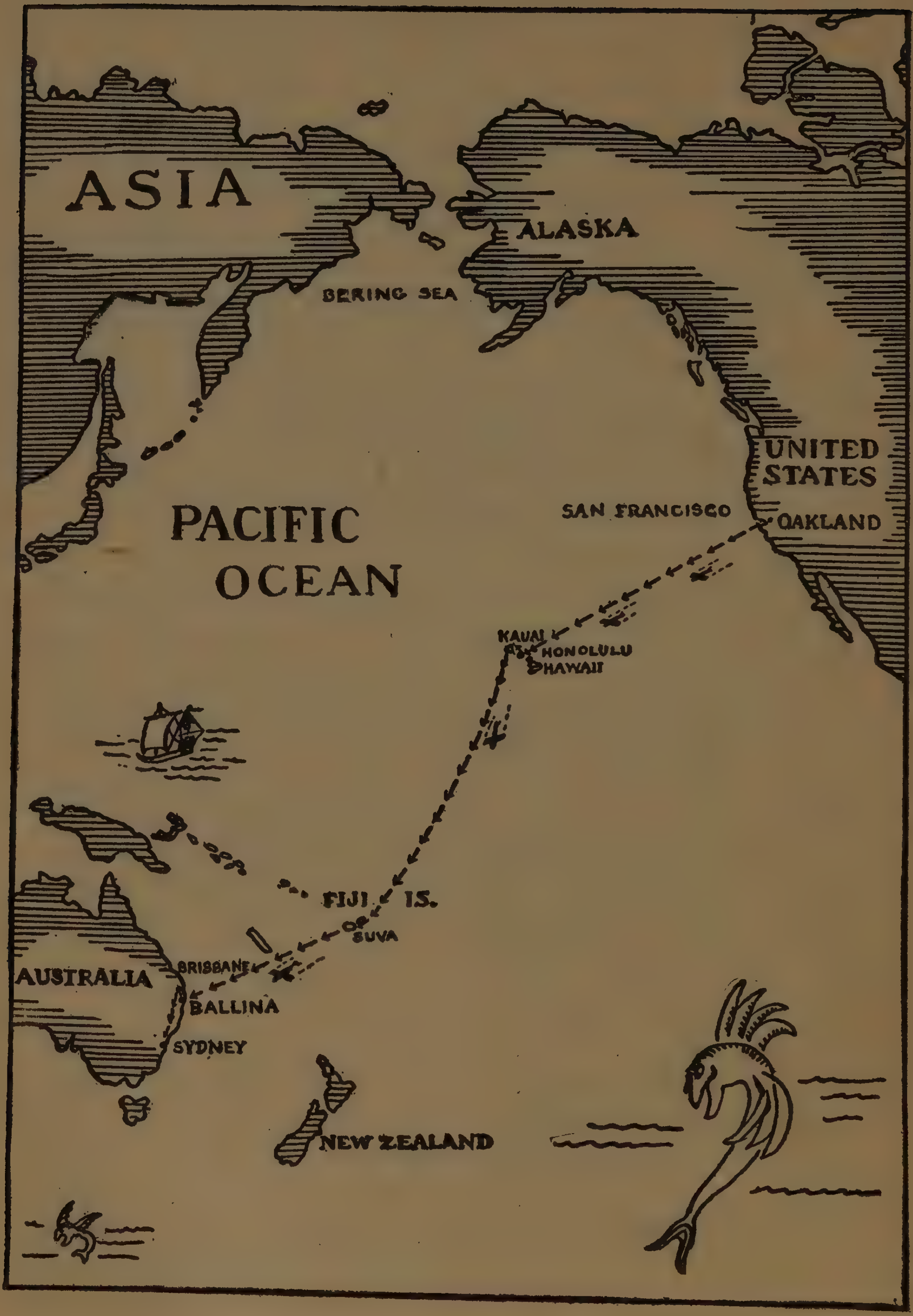

ASIA
ALASKA
BERING SEA
UNITED STATES
SAN FRANCISCO
OAKLAND
PACIFIC OCEAN
KAUAI
HONOLULU
HAWAII
FIJI IS.
SUVA
BRISBANE
AUSTRALIA
BALLINA
SYDNEY
NEW ZEALAND

Part One: PLANS AND PREPARATIONS

CHAPTER I

TWO MINDS WITH BUT A SINGLE THOUGHT. EFFORTS TO SECURE MONEY BACKING FOR A TRANS-PACIFIC FLIGHT. WE COME TOGETHER. STIMULUS OF THE ATLANTIC SUCCESSES. WE FLY ROUND AUSTRALIA.

WE have not in the history of human affairs yet accounted with any degree of authenticity for variation in individual taste. Nor are we any better able satisfactorily to account for the varying ambitions that are born in the human mind.

Yet, with the rapid march of aviation when the ambition has taken an aeronautical turn, it is surprising what an effect the movement of the calendar has had on its reception.

We nurtured an ambition to fly the Pacific from America to Australia. We nurtured that ambition for ten years. Unknown to each other we were both dreaming the same dream at the same time.

For six years we cherished the ambition independently.

For two years we dreamed jointly until the dream solidified into a practical possibility, and has now further hardened into a concrete fact. The dream has been realized.

To us the dream has always been capable of realization.

But eight years ago the confiding of the ambition to men received an altogether different hearing from that which is given to it to-day. Eight years ago, when you told people that the Pacific would be flown, the statement, the confiding of the ambition, was met with a glance that amounted to almost a kind of indulgent pity. People were courteous, but cold towards the idea.

Eight years ago, ocean flying was only in its infancy compared with the stature it has reached in the aviation of to-day.

Yet, at the close of the war we indulged visions of spanning the long sweep of the Pacific between some point on the American coast and some point on the coast of Australia. Starting points, routes, destinations, were to us then in a vague mental mist. We were quite indefinite as to route, blissfully indefinite as to method, and equipment, but unwavering on the broad ambition that we must fly across the Pacific and seek to do it in the shortest possible time that it could be accomplished.

The precise date, when the ambition first blossomed in our minds is a little indefinite, but with both of us it would be very shortly after the close of the war.

In 1920 Kingsford-Smith was in America. He sought to interest certain men in a flight across the Pacific. But in 1920 the idea of spanning the Pacific by a plane was assured of a reception that a proposal to establish a radio station might have received from Tudor England.

In 1921 he was still searching, this time in Australia, for that elusive finance that nobody showed the slightest disposition to risk. In the same year Ulm was making repeated endeavors without success to secure money backing for a trans-Pacific flight, and also for other long distance flights in Australia.

Neither of us had the remotest idea that the other nurtured the same ambition or was engaged in the same wooing of possible or probable or prospective money for exactly the same purpose. We were dreaming our dream independently; the dream was remaining a dream, and the search for the money was just as difficult as trying to remember in the morning the details of any commonplace dream.

One day in 1921 we met at Mascot Aerodrome, Sydney, for a few fleeting minutes, and parted still in ignorance of the fact that here were two minds thinking along the same channels, and that a fusion of interest might have been helpful.

Kingsford-Smith went to Western Australia. There he made further efforts to interest men of substance or combinations of men of substance in the project of flying the Pacific. But the most reasonable theories that he could advance about such a venture, the most cogent arguments about the prestige that was likely to accrue to Australia in an aviation and scientific sense, all fell on stony ground.

The required money was not forthcoming.

At the same time, Ulm repeatedly sounded interests in Sydney and Melbourne that possessed the necessary finance if they were prepared, to employ the sporting phrase, "to give it a flutter." But nobody seemed to be in the slightest way inclined to give a few thousand pounds a flutter on a trans-Pacific flight.

There was not a lack of interest. The interest was there in many cases, but there was a hesitancy to back that interest in a practical way. So both of us pursued our fruitless quest for finance for five more years without having had the opportunity of meeting in the meantime, and, so to speak, "pooling" our ambition and pooling, too, our quest for the funds with which we might have attempted to give effect to that ambition.

It was not until early in 1927 that we met again, this time in the firm of Interstate Flying Services, which was operating in Sydney. Then we discovered that so far as the trans-Pacific flight ambition was concerned, we were, to employ the phrase of the sentimental novelists, "twin souls."

We decided first to fly round Australia.

That was a project which did not meet with the same aloofness when the question of finance was broached. At the moment, doubtless, it had a more practical ring about it than an air voyage across the blue wastes of the Pacific. Ulm was successful in obtaining the needed financial backing for this plan, and he proceeded to organize the flight. At that date, when we agreed to become partners in a flight round Australia, the time record for the flight round the Continent had been established by Captain E. J. Jones, of the Department of Civil Aviation. He had completed a circuit of the Continent in twenty-two days and eleven hours. We planned to fly the distance, 7,500 miles, in ten and a half days.

In the days when we were preparing for this flight round the Continent, we constantly reverted in our chats and conferences to the subject of the trans-Pacific venture that had been for so long a consuming ambition with both of us. We talked routes and equipment and starting points with what we now know to have been an amazing ignorance of the conditions and the very first principles of such a flight. We talked, too, the most pressing question of money to provide the sinews of the flight in whatever form they might prove to be. It was then that we entered into a tacit partnership that later became the actual legal partnership which at present subsists between us.

We at least traversed the road to a partnership to the extent that we agreed that if one or the other of us could secure the vital money that we needed we would make the big flight together.

Our ambition, then early in 1927, was by no means the nebulous vision that it may have seemed to people far back in 1920, because in those seven years a century of progress had been made in aviation. Long distance flying over oceans in planes was no longer the fantastic dream that men were disposed to regard it round 1920. There came the dash of Colonel Lindbergh across the Atlantic in the "Spirit of St. Louis," a feat that stirred the world. There followed the amazing flight of Chamberlin and Levine, and the great dash of Byrd with its piece of ill-luck just on the threshold of complete triumph.

These trans-Atlantic flights caused long distance ocean flying in heavier than air machines to loom larger in aviation than it had ever loomed before.

Its feasibility had been demonstrated. The ice, so to speak, had been broken, and broken with an emphasis that was beyond cavil.

And those same trans-Atlantic hops, in addition to proving the theory that we had been propounding individually for so long as a forlorn hope, had increased a hundredfold our ambition to be the first to master the Pacific.

As the march of events headed later, the flight round Australia was but a flying preparation for the larger venture whenever the money was forthcoming. It was not without value as such, although we were obliged to revise a number of our ideas to such an extent that the circuit of the Continent might well have been an experience of six years earlier. At least, that is how it seemed when later we came face to face with the larger and more complex problems that were associated with the Pacific flight.

On the round Australia flight we had plenty of experience of flying in most grueling conditions. We used a Bristol Tourer plane that was seven years old, and the engine had run for more than 1,100 hours. To prepare the machine for the flight involved incessant toil day and night.

We left Sydney on June 19, 1927, with our first stop at Brisbane. We had enlarged the capacity of the oil tank of the plane to enable us to keep aloft for about twelve hours. We fitted the rear tank under the pilot's seat with a funnel that allowed us to pour petrol into the tank from ten or twelve tins that we carried in the back cabin.

At no point round the Australian coast were there any aids to night flying, so that we had to fly from daylight to dark. When we landed each evening, no matter how tired we felt, we at once filled the tanks with petrol to be ready for the next day's hop. On the hop from Camooweal, Queensland, to Port Darwin, we broke the Australian non-stop distance record for a flight of about 750 miles.

On the last hour of that hop the engine developed a badly-blowing exhaust valve. When we looked over the engine at Port Darwin we were forced to realize that it was in pretty bad shape. There was no chance of replacing the broken exhaust valve at Darwin, so we decided to take a risk and to push on if possible to Broome, on the west coast of Australia, 860 miles from Darwin.

On this flight we did really take a risk. We flew over country that was unknown, country that had never been seen by a white man from the air, or even by overland travel. Hundreds of miles of our route lay over the Kimberley Ranges. There we flew in a dead straight line over the mountain barrier bristling with buttes of rock and roughly-timbered slopes. At many points we found ourselves nearly 200 miles from the coast, and on the other side nearly 180 miles from the telegraph line that threaded its way through the endless ocean of bronze-green bush, and was the nearest means of communication.

If we had been forced down, and were obliged to seek help through the telegraph line it would have been some weeks before any help could have reached us. Aboriginal tribes that roamed through this wilderness of scrub were reported to be hostile. We carried nothing of any kind with which we could have defended ourselves had they forced their belligerent attentions on us. Our sole baggage consisted of a few sandwiches and oranges and drinking water. Our chances of getting back to civilization would have been slender had that old engine chosen to peter out there above those dim misty gullies lying at the foot of the long Kimberley Range.

But the engine did not peter out. It carried us over that most inhospitable tract of country to Broome safely, and did it in a time that broke the Australian flight distance record that we had set up ourselves only two days earlier. At Broome we tackled a task that was the hardest that we have ever undertaken in the space of twelve hours. With the help of only one mechanic we completely top-overhauled our Siddeley Puma engine. In this overhaul we replaced the blown exhaust valve, tuned up the motor, and on the next morning we tested the engine on the ground. It ran well, and we took the air on our next stage of the flight from Broome to Perth. Then we were in country that Kingsford-Smith knew thoroughly. For two and a half years he had flown as chief pilot with the company that operated the air mail service from Broome to Perth. On that stage, however, as we had left Broome later than we intended, night fell before we reached Carnarvon (W.A.), which was the next stop on our route. We landed just after dark at Minilya Station, and in the morning flew the eighty miles on to Carnarvon. We stayed there just long enough to refill the petrol tanks, and took off again for Perth. Heavy rain lashed us from 120 miles south of Broome, and low rain clouds forced us to fly lower and lower.

We were compelled to fly at altitudes so low that they would have made any flying man blanch. Our average altitude over country that was very lightly timbered was not more than 100 to 150 feet. In bursts of 50, 60 and 100 miles in country that was treeless we came down to well below 50 feet. It was risky, but we set our minds on breaking that round Australia record, and we took the view that the risk was well worth while.

Rain dogged us steadily for the greater part of the next thousand miles, but the flight from Perth to Melbourne was accomplished without any outstanding incident. We reached Melbourne on June 28th, both completely worn out by the rigors of the long coastal and bush flying, in which we had met most nerve-racking conditions.

That night in Melbourne, in some respects, might be regarded as another of the many milestones in our long road to the trans-Pacific flight. We again discussed the project, this time with greater seriousness than before. We talked over different methods by which we might have secured that very vital money backing. In these talks and conferences, we had the benefit of the advice of several well-known business men in Melbourne who were personal friends of both of us. Before we set out on the flight round the Continent, which had now been completed so successfully, we had mentioned our trans-Pacific ambitions to Mr. H. Campbell-Jones, Managing Editor of Sun Newspapers Limited, Sydney. We had talked with him also on the methods by which such a venture might be financed. He had met us with enthusiasm; he was sympathetic towards the project, and proved a very good friend. At almost every stop on the flight between Broome and Melbourne we had sent telegrams to Mr. Campbell-Jones asking him for an interview to go into the whole matter more exhaustively when we reached Sydney.

Sydney gave us a really wonderful welcome, and we derived new courage for seeking to pursue our Pacific flight ambition by the words of praise and the very definite expressions of confidence in us that came from the then Premier of New South Wales (Mr. J. T. Lang).

On the day after our arrival in Sydney, Sun Newspapers Limited gave a luncheon in our honor at the Hotel Australia. The gathering included most of Sydney's leading business men. In responding to the congratulations and the expressions of confidence that were showered upon us by different speakers at the luncheon, we came into the open definitely with our long-cherished Pacific ambitions. We told the company of the plan that had been in our minds for so long, and for the first time publicly we spoke of the vital need of funds to enable us to do that which we had in mind and felt quite capable of carrying through to success. We went further, and asked the gentlemen round the table and the people of Australia generally to supply us with the necessary money to enable us to undertake the trans-Pacific flight.

Events followed one another rapidly in that week in Sydney. The Premier (Mr. Lang) publicly an-

A SUCCESSFUL PARTNERSHIP

Squadron Leader C. E. Kingsford-Smith and C. T. P. Ulm at the completion of their seventy-five hundred mile flight round Australia—the first of their partnership.

THE CREW OF THE "SOUTHERN CROSS"

Reading from left to right: Harry Lyon, Navigator; C. T. P. Ulm, Relief Pilot; C. E. Kingsford-Smith, Pilot; and Jim Warner, Radio Operator. This photograph was taken immediately prior to the flight from Long Beach Airport to Los Angeles.

nounced that his Government was prepared to guarantee an amount of £3,500 for the big flight. Other tentative promises of support heartened us, and at long last we began to see a clearer path towards the realization of our ambition.

And so we decided to leave for America.

About a week before we sailed for San Francisco we asked Mr. Keith V. Anderson to join our expedition as co-pilot. Our plans at that time were vastly different from those on which we eventually hopped off from Oakland. They were to be subject to many revolutionary changes in the intervening ten months. The idea at that moment was that we would start out from America as a crew of three. We planned that Ulm would have the time to acquire a knowledge of navigation that would be sufficient for our needs. Thus we would have two pilots and one navigator and organizer. There were a thousand details to be adjusted in the few days that remained till the sailing of the s.s. "Tahiti" on July 14th. Everybody was willing to help us in every possible way in those strenuous days, and all three of us were enabled to sail on the "Tahiti."

CHAPTER II

WE ARE INVITED, BUT DECLINE, TO TAKE PART IN THE DOLE RACE. OUR CHOICE OF A PLANE AND ENGINES. GOOD FRIENDS COME TO OUR HELP. WE BUY A FOKKER FROM SIR GEORGE WILKINS.

IT was only a day or two before the sailing date of the "Tahiti" that we drew up our first definite plans for the flight itself. Our idea then was to use a plane similar to the one that Colonel Lindbergh used in his successful dash across the Atlantic that had stirred the world.

We planned to use a machine of this type with a single engine as a land plane from San Francisco to Honolulu. There we proposed to fit the plane with floats and fly to Australia by hops that would include Fanning Island, Phœnix Island, and others. So impressed were we with the type of machine that Lindbergh had made famous that we sent cable messages to America asking for specifications of planes similar to it.

But what a vast amount we had then to learn about the problems that the spanning of the Pacific presented.

What incorrect ideas we had; what amazing blanks in our knowledge of ocean flying; what a reckless optimism did we feel about engine power and equipment that was vastly different from that needed on such a long and arduous flight.

In the light of later experience those early plans that we framed with what appears now to have been almost a gay abandon, were merely a wild groping in the dark. We know now that then we had not acquired a knowledge even of the rudiments of long distance ocean flying.

The course of study was long and valuable to us. It was a course that included the big factors of blind flying and overloaded ocean flying, of which we, as well as most Australian airmen, had to confess to a lamentable lack of knowledge in July, 1927. There was a candid want of confidence in us publicly expressed by certain Australian airmen. Their critical views were based on that lack of knowledge of those two biggest factors in the Pacific Flight, or in any long distance flight over an ocean. We only began properly to appreciate the difficulties that faced us when we got to close quarters with these aspects of ocean flying in America.

On the question of navigation of a plane over great sweeps of ocean what vague ideas were those that we held early in 1927. We were always impressed with the vital value of efficient navigation on such a flight, but how far short of efficient navigation did our theories fall then.

How revolutionary were the changes that came later in the light of fresh knowledge!

In fact, in a week in America we had jettisoned without a qualm more than half of our pre-conceived notions of how the Pacific could or should be mastered in the air.

Neither of us was a navigator. To gain a working knowledge of navigation, therefore, was essential. In the few days we had in Australia before the departure of the "Tahiti" we were given our first lessons in navigation by Lieutenant John Walker, R.A.N. We aimed at completing our study of the subject on the voyage to America. On the "Tahiti" few students have ever swotted with greater intensity for their annual examinations than that with which we applied ourselves to the study of navigation under Mr. W. A. Todd, Second Officer, and Mr. H. A. Litchfield, Third Officer, of the "Tahiti."

Both of our instructors did their best with us. We learned much on a subject that was not without its complexities and its nasty problems for beginners. But the voyage was comparatively short. Our instructors had by no means the time at their disposal to turn us into really competent navigators with sufficient skill to steer a plane on a flight such as we contemplated.

We reached San Francisco on August 5th, 1927, to find the whole west coast athrob with excitement over the coming race to Honolulu for the Dole prize. It was to be flown the following week.

No sooner had we left the steamer than we were told by Mr. Herbert L. Dickie, of the Vacuum Oil Company, that he had secured for us an option on a plane in which we could compete in the Dole Race. On the next day we looked over the machine, which was an International biplane, fitted with a Wright Whirlwind engine, and carrying the name of "Miss Hollywood." At the same time, we took a look at all the machines that were to take part in the Dole Race, and we met Mr. Frank A. Flynn, Secretary of the Aeronautical Association of America. Mr. Flynn very kindly gave us most of the details that were associated with the dash for the Dole prize.

During our first two days ashore we were intent on saturating ourselves with every fact about the race, the type of machines competing, and the flying problems that the race involved. It took us only a few hours to realize that we could not organize efficiently for a flight of 2,400 miles over an ocean in three or four days. We came also to appreciate the very vital fact that we had no experience of flying aircraft so heavily overloaded as any plane would have to be to reach Honolulu safely.

We had seen the planes that it was planned to take out over the Pacific; we had met the competitors, and had discussed engine and loading problems, but out of all this observation and discussion emerged a very definite conviction in our minds that the flying equipment that it was proposed to use in the Dole Race was by no means sufficient for the nature of the task ahead. We had also formed the opinion most emphatically that those fliers who proposed to compete in the Dole Race using a single-engined plane, were allowing themselves too small a margin of safety.

The Dole Race was flown in the following week. All the world knows what happened. It was a tragedy. Its outcome was almost exactly in line with the predictions that we had made in cable messages to Australia. We deeply regretted those disasters out on that 2,400 mile ocean trail, but we cannot honestly say that they came as a surprise. To us any attempt to fly to Honolulu in a plane with one engine appeared foredoomed to failure. Those disasters created a profound depression in aviation circles on the west coast of America. It was the Dole Race men who really pioneered the ocean route to Honolulu. They blazed the trail, and we followed, profiting from the mistakes that had led some of them to disaster. These mistakes and their consequent disasters placed a new complexion on long distance flying over oceans.

They brought into bold relief those two comparatively new angles to flying—heavy overloading and blind flying.

They gave powerful confirmation to our view that with a plane with a single engine the margin of safety in ocean flying was far too small. But we deeply deplored the fact that that confirmation had cost the lives of several gallant men and an equally gallant woman. It is not from any desire to flaunt superior knowledge that we record our opinion here, and mention the fact that the low margin of safety given by one engine only was certainly a big factor in the Dole Race disasters. It is certainly not in any spirit of exultation at the tragic support of our opinion that we include it in this book. But the tragedy of the Dole Race impressed one thing upon us indelibly. This was that in any trans-Pacific flight we needed the best equipment it was possible to secure.

At all times we were anxious to have a complete wireless installation in the plane we used. This desire was not for a second dictated, as some people believed, by a desire to allow listeners on both sides of the Pacific to keep in touch with our plane. The value of radio in air navigation is incalculable, and in an emergency its aid, of course, is obvious to any one. The wisdom of our desire in this regard was vindicated in a striking way by the experience of Irwin and Eichwaldt in the "Dallas Spirit." Their short-wave transmitter allowed shore stations to know exactly what they were doing. It made us keener than ever to carry with us the best possible radio equipment that we could obtain.

So it was that we had to face the strenuous task of equipping ourselves in that period of gloom that followed the Dole disasters when every prospective piece of ocean flying came to be regarded by most people as suicide, or, at best, a reckless flirting with death. This was a big burden to carry when money backing had still to be secured for various phases of our proposed flight. At any rate, it was in a considerably altered (we might even say chastened) frame of mind that we applied ourselves to a study of the problems that were involved in a flight across the Pacific to Australia.

We began from what we considered the most sane basis—that of established precedent. In this respect we had the advantage of ample material. We reached America at a period when there was quite a rush of trans-Atlantic and other long distance flights. We studied all the data we could collect about each of them. This was a fairly formidable task, but we tackled it with zest, as the Dole Race, instead of damping our ardor for the Pacific venture, whetted our ambition still more. We were more confident than ever that the whole flight to Australia was possible with a large margin of safety, provided that we could secure the right plane and the proper equipment.

First we learned all we could about the types of planes that had been used in the dashes across the Atlantic, the Honolulu hop and other long distance flights over sea. Whether the flights were successful or not did not matter to us. We studied the equipment that had been used in the flights that had failed, and sought to discover where the weak point in the equipment lay that had caused them to fail.

With those flights that had succeeded we examined the data about their equipment, and sought to determine which particular combination of plane, engines and instruments had given the most favorable results. We set out to learn, too, what was the maximum wing loading and power loading in the different types of machines employed. At the time the world's record for composite loading was held by Kelly and McCready, established in a Fokker plane on the flight across the American Continent.

Our long and careful study of these ocean flights brought out the very vital fact that in all those that had been successful the machines had been fitted with Wright Whirlwind engines, and that Fokker planes loomed very largely in this list of successes.

In examining the flights over oceans that had been of world-wide interest these facts were highly significant. Byrd, in his flight across the North Pole, had used a three-motored Fokker plane and Wright Whirlwind engines. In his hop across the Atlantic he had been similarly equipped.

Maitland and Hegenberger, in their successful pioneer flight to Honolulu, had flown a three-motor Fokker with Wright Whirlwind engines. Lindbergh, in his amazing dash across the Atlantic, had flown a plane that was driven by a Wright Whirlwind motor. In their Atlantic flight, too, Chamberlin and Levine had used a plane with the same motor. The planes that had been piloted by Art Goebel, first in the Dole Race, and Martin Jensen, who finished second, were propelled by Wright Whirlwind engines. Then, again, Chamberlin and Bert Acosta had made their endurance flight record with a Whirlwind engine.

These facts, when looked at in their proper relation, showed clearly that the Wright Whirlwind engine was much more than just a reputation. It was a good reliable engine. There was no disputing that succession of very outstanding victories that it had scored. In short, it was the engine for us. Of that we were convinced when, so to speak, we had dissected the elements that made for success in these flights. Examination of the same set of flights, too, seemed to demonstrate also the dominance of the Fokker as a plane for lifting high loads.

In three flights which were one hundred per cent. successful, and of immense scientific value, both of these facts stood out with prominence. It was so in Byrd's flight over the Pole, which was a thoroughly organized effort, as also was his trans-Atlantic flight. It was so, too, in the fine flight of Maitland and Hegenberger, from Oakland to Honolulu—the pioneer effort. It was so when Kelly and McCready put up their loading record in a Fokker.

It was patent to us or to any one after a study of these important facts that the Fokker undoubtedly was the plane to lift the load, and the Wright Whirlwind motors were undoubtedly the engines to push the Fokker through with sufficient power to meet all requirements.

By one of those strange coincidences, or perhaps it may have been Fate, just as our opinion of the Fokker plane had soared very high indeed, we were brought, so to speak, to close quarters with a Fokker. Quite suddenly and unexpectedly a Fokker was placed within our reach. It was a telegram to us in

San Francisco from Sir George Wilkins, who was then in Seattle, that completed this coincidence.

Sir George Wilkins told us in the telegram that he had a Fokker plane that he could sell to us without engines or instruments. We telegraphed back to Seattle, telling Sir George Wilkins that we were decidedly interested in the offer, and asking him to come down to San Francisco to tell us all about the plane. He came down, and in the course of many long chats, we gained a vast fund of valuable information from him. We were keenly interested in the work he was doing, and its world importance, and after these chats we became firm friends.

At that time we held more than sufficient money to buy the Fokker without engines or instruments, but we did not have sufficient cash to obtain the instruments as well. As an outcome of our study of the ocean flights, our talks with competitors in the Dole Race, and with other leading American flying men, and our conferences with aviation officers of the American Army and Navy, we decided that to do the flight which we aimed at, we must have a three-motored Fokker plane.

This meant money!

If it could be secured we felt that we had a most excellent chance of success in a Fokker with three Wright Whirlwind engines.

With a single-engined plane we were sure that there was only a poor chance of flying to Australia. With a large machine like a Fokker we would be enabled to increase the crew to four, and to take with us a skilled navigator. This idea was wonderfully attractive to us, as we felt that to accomplish a successful flight to Australia we needed one hundred per cent. efficient navigation. Whatever route we finally decided upon, the hops would be to islands, and some of these would mean, in effect, steering for a speck on the map. Skillful navigation, we were convinced, was all important in a long flight over an ocean.

We had reached this point in our conclusions, and had definitely jettisoned many of the ideas which we brought from Australia with us, when we met Mr. Sidney Myer, the well-known Melbourne business man, and Mrs. Myer.

After several most cordial meetings we asked Mr. Myer to help us financially, that we might be able to secure a Fokker plane with three engines.

Mr. Myer was aghast at the proposal of ours to fly the Pacific to Australia. He hesitated in acceding to our request, but he made it quite clear that his hesitation was dictated solely by his fear that we would fly out from Oakland to our deaths.

Mr. Myer seemed to be convinced that we would go out and crack our necks. He acknowledged candidly that though he would have liked to help us he was positively scared to do so, lest he should have any part in a venture which might cost us our lives.

We impressed on him that whether we flew a plane out over the Pacific fitted with three engines or one, we were determined to attempt the flight.

Mr. Myer, when he was convinced finally of our determination, and when he learned such a flight was an ambition that we had nurtured for years, came to our help in a most generous way. He handed us the sum of £1,500, and he refused firmly to have it considered by us as being a loan. He desired that it should be regarded as a gift and nothing else.

Many times Mr. Myer made us his guests at his beautiful home in Burlingame, near San Francisco, and with Mrs. Myer was wonderfully kind to us during our whole stay in America.

But soon after he had given us the £1,500 he called on us at our hotel in San Francisco. It was one of the many dramatic interviews that were associated with our preparation for the flight. Mr. Myer approached us in a most serious mood. He was gravely concerned for our safety. The gloom engendered by the Dole Race disasters still hung heavily over the Californian coast.

"Look, boys," he said to us, "you have that money.

It is yours; it is nothing to do with me; I am not associated in any way with the purpose to which you may put that money. But, seriously and earnestly, I want you to put that money in your pockets, and do not risk your lives in this flight. Do not attempt the project. I feel really concerned for your safety."

We expressed to Mr. Myer our thanks for his wonderful generosity and kindness to us, but we told him that we had not swerved one fraction from our fixed resolve to fly to Australia.

Mr. Myer seemed downcast at this, but he realized that we had cherished our ambition too long to be able to fling it away lightly.

A few days after we arrived in San Francisco, we met Mr. Locke T. Harper, the West Coast Representative of the Vacuum Oil Company Pty. Ltd. During our long stay in America, and through some days that were particularly harassing to us, Mr. Harper proved a wonderful friend. He gave us the use of his office, which we made our headquarters for eight months.

In the midst of the many worries that beset us about this time, we had a group of staunch friends. There was Mr. Myer, Mr. Harper, Mr. R. H. Smith, Mr. Frank C. Jordan, senr., Secretary of State for California, and his son, Frank M. Jordon, Mr. Carlos S. Greely, and Mr. James H. Fort. We spent many happy hours at the homes of all these people.

After we received the generous gift from Mr. Myer we decided to buy the Fokker plane from Sir George Wilkins. Financially, at that moment, the clouds seemed to be revealing a silver lining both literally and figuratively. We were buoyed up by very encouraging news from Australia. Right through our dark days and our pleasant ones, the Returned Soldiers and Sailors' Imperial League of Sydney was a staunch supporter of everything we did. This support was an inspiration, and we were wafted to the seventh heaven of delight when the League sent us a cable that seemed to etch the darkest clouds with silver. That cable told us that there was every indication that we would receive a larger guarantee from the New South Wales Government, and that enthusiastic public subscriptions in Australia had yielded £1,000. This was indeed heartening news. We pushed ahead with our negotiations with added confidence.

We at once engaged Phil. C. Salzman, an engineer of outstanding ability. Ulm and Salzman went to Seattle to look over the Fokker plane that had been offered to us by Sir George Wilkins. After they inspected the machine with the Service Inspector of the Boeing Aircraft Factory, we were completely satisfied with the Fokker, and resolved to complete the purchase. Here, again, we were indebted to the generosity of Sir George Wilkins. The money that we needed to buy our engines had not arrived from Australia, but he allowed us to pay half the purchase price, 7,500 dollars, for the plane alone. This allowed us to order the engines at once.

We had made a big step towards the realization of the first half of our ambition—that of having the adequate and effective equipment with which to carry out our plan.

CHAPTER III

WE CONTEMPLATE A HOP OF 4,200 MILES. ANDERSON GOES TO HAWAII TO REPORT ON TAKE-OFF PLACES. NEGOTIATING FOR ENGINES. OUR DRAMATIC INTERVIEW WITH ADMIRAL PEABLES. WE ARE ASKED TO RETURN TO AUSTRALIA. WE "KEEP ON KEEPING ON." ANOTHER FINANCIAL IMPASSE.

SO bright a turn had our financial prospects taken that we reverted to the question of route. Our old plan of flying the Pacific to Australia by way of Fanning Island and Phœnix Island had now passed into the realm where many of our other early ideas were shelved. We began now to consider a route from San Francisco to Honolulu on to Lae in New Guinea and down to Brisbane. This was a route that would test the very best equipment to the utmost possible limit. It involved one stage of 4,200 statute miles non-stop flying over the ocean from Honolulu to Lae. It meant a great load of gasoline, and that in turn meant big tank capacity. After discussing this problem with the engineers of the Boeing Aircraft Factory, we decided to add two additional aluminum tanks to the existing tankage of the Fokker. One of these, capable of holding 330 gallons, was fitted just behind the existing main tank, that held 800 gallons. The second, with a capacity of 110 gallons, was fitted under the pilot's seat. With this extra supply we considered that the Fokker would be given the range sufficient to take it over that 4,200 miles non-stop flight. In fact, it was largely because of the long range that the Fokker was capable of doing, that we entertained the long hop from Honolulu to Lae.

At this time our party was scattered along the west coast of America. Smith was in San Francisco busying himself on the thousand and one details that were constantly turning up. Ulm was in Seattle, where he had gone to complete the deal with Sir George Wilkins, and Anderson was about to leave for the Hawaiian Islands.

Was the aerodrome at Wheeler Field suitable for the taking off of a heavily overloaded plane? That was the next question that began to worry us. It was a distinctly worrying problem, because different flying men and others who knew Wheeler Field held varying opinions of its suitability when a long runway was needed. Some of them assured us that we could take off satisfactorily with an overloaded plane. Others declared it was far too risky. Others told us that a far better take-off place existed at Barking Sands, on the Island of Kauai. They strongly pressed its claims. We were not well acquainted with either of the localities, and, in accordance with our fixed policy of not leaving anything to chance, we decided that we would obtain our own first-hand information about them. Undoubtedly one of the biggest hazards in an ocean flight of the character we were contemplating lay in the "take-off." That was the point where unsuitable ground might wreck the project before it had well begun. Its importance was far too vital to us to rest content, and accept hearsay as our guide. To bring back full details about both Wheeler Field and Barking Sands, Anderson left for Honolulu. Ulm stayed with Salzman, who was putting the extra tanks into the machine.

Hardly had Anderson sailed for Hawaii than we were brought face to face with another of the host of difficulties that seemed to dog our path. We needed three Wright Whirlwind engines. When we tried to get them, we found that the factory which turned them out was eighty or ninety engines behind with its orders. Here was a development that looked for a while like an ugly setback. We might have had to wait for a very long time to secure our engines if our order was to be treated in the ordinary rotation of trade. That vista of eighty or ninety engines that had yet to be built before ours would get under way was a nightmare to us for a few days. We were firmly resolved that we would have Wright Whirlwind engines, and no others. But how were we to get these engines within a reasonable time?

We asked the Naval and Military authorities in San Francisco if they could help us. On their advice we telegraphed to the British Ambassador at Washington and the Australian Commissioner (Sir Hugh Denison) at New York. We asked both of these gentlemen to approach the United States Secretary for War with a request that the United States Military authorities should allow us to take from the works three Wright Whirlwind engines that were part of a current Government order. Our proposal was that if the Government let us have these three engines, we would place an order with the works for three engines which the Government could accept as part of its order when the engines were completed in place of the three Government engines that were passed over to us. As was our experience at all times in those strenuous days, we received the usual hearty coöperation from the Naval and Military authorities.

In these days there were many very human stories associated with our efforts to secure the best equipment possible for the long flight. We will not soon forget the amazing and, in a sense, dramatic interview which we had in San Francisco with Admiral Peables and his A.D.C., Lieutenant Benn Wyatt, who had been the Navy Technical representative on the Dole Race Committee. Mr. Harper had secured for us an introduction to the Admiral.

We found him a decisive type of man with a faculty for talking straight and saying what he meant to say without any finessing.

We were ushered into his office.

"These boys," Mr. Harper began, "are going to fly the Pacific to Australia."

"I don't want to see them," said the Admiral, with a decisive snap of a decisive jaw. "The fellows are crazy. . . ."

"I-I-I," the Admiral stumbled for a word. He was red of face, and seemed convinced that he had to deal with members of a Suicide Club.

As we have mentioned, the whole western coast had been plunged in the deepest gloom over the tragedies of the Dole Race. Added to that were the series of disasters in attempted dashes across the Atlantic. The moment could not have been less propitious to approach the Navy for help in securing engines for another long ocean flight.

Admiral Peables pounded the table with his fist.

"I do not want to be interested in this thing in any way," he said. "I don't want to be connected with it—you're crazy. Flying to Australia! I don't want to be brought into this thing at all; I want to keep right outside of it. Look at what happened to the Dole fliers."

The Admiral paused.

We were about to seek to justify what he believed to be a reckless disregard for our lives, when he began again.

"Look," he said, "don't you realize that the Navy is spending hundreds of thousands of dollars in searching for those fliers that were lost in the Dole Race? Think, boys; don't do it. Don't go on with it. Forget it. Anyhow, I want to keep definitely outside of it, and I don't want to become mixed up in any negotiations that might start this crazy flight of yours going."

He called into the office Wyatt, who has done a large amount of long distance flying in America. He wanted Wyatt to help him to advise us and bring us to see the error of our ways. In fact, Admiral Peables at that moment seemed to believe that he was going to talk us out of that onslaught on a job that was the consuming ambition of the lives of both of us.

"These fellows are talking about flying the Pacific to Australia," said the Admiral to Wyatt. "To Australia—get that. Give them some advice. They're crazy."

"If that's what they're going to do," said Wyatt, "I do not want anything to do with them. I don't want to know anything about such an idea. I do not know what equipment you are going to use or anything about it."

This was a little discouraging, as we had expected more sympathy with our plan from Wyatt. But at last, after this devastating barrage of criticism, there came a lull. We could talk. Wyatt was pacing about the room in an impatient way.

"We are going to use a three-motored Fokker," we said.

Wyatt grabbed a chair and sat down.

"Now, that's different," he said.

They were magic words those—"a three-motored Fokker."

"That is different," Wyatt and Admiral Peables repeated in unison.

They were now both in a much more amiable mood. Their faces were wreathed in smiles. They got down to talking the thing over in a calm and even a sympathetic way. It was an amazing change.

In the chat they both made it clear that the only flights against which they set their faces definitely were those that were hurriedly and poorly organized. They had no desire to curb the air ambitions of any flier, but the responsibility of being in any way associated with an ill-considered, ill-planned venture was too great.

We told the Admiral that we would have a crew of four, with two pilots, a navigator, and would carry wireless. From that moment the two, unofficially, of course, were ready to coöperate with us in our plans. They advised us on the best means of securing the engines, and they assured us that the State Naval Office at San Francisco was at our disposal with every possible source of information.

"Make it your home," were the last words of Admiral Peables as we left him that day.

Not in all our experience on the west coast of America had we encountered such a swift transition from a coldness that almost amounted to hostility to the most sympathetic help. Of course, it is but fair to state that that coldness was dictated not from any inherent hostility to our plan, but simply in solicitude for our lives and our own welfare.

From the office of the Admiral we passed on to that of Captain Davies, who is officer in charge of Navigation for the United States Navy Department at San Francisco. He, too, proved a good friend, and made available to us a vast amount of valuable information.

But the change in the outlook of Wyatt towards the flight was indeed remarkable. He became so interested in our plans that he moved for three or four nights to the hotel in San Francisco where we were staying, and took the room next to ours, so that further conferences and discussions on the details would be rendered more convenient.

With the help of these officials and the representations of the British Ambassador and Sir Hugh Denison to the United States Secretary for War, our proposal to take over three of the Whirlwind engines from the Government was received kindly, and the engines were duly delivered. Here was a big step forward, and we again resumed our buoyancy of spirits. Salzman went to supervise the delivery of the engines, and it then became necessary for us to secure the services of a good mechanician. We found an ideal man for the job in George A. Heddinger. Ulm then went to San Francisco to pursue that exacting quest for more finance, to collect a mass of necessary data, and to order our wireless equipment.

For our needs we wanted the maximum possible wireless equipment that could be carried, and that of the least possible weight. In our search for the right gear Ulm had many long interviews with Ralph Heintz and Jack Kaufman, of Heintz & Kaufman, radio engineers. The path was now becoming a good deal smoother. Yet at that favorable moment, as so often happened before in our plans, there came a development that was to say the least devastating. Twenty-four hours after the prospects had reached their most glowing stage came the earthquake that threatened to tumble all our best laid plan in utter chaos.

Our last news from Australia had heartened us, but the next piece of news that reached us at this stage was of a strikingly different character.

First came cable messages from newspapers that asked us to return to Australia and abandon the proposed flight.

Then followed appeals from individuals that strongly urged the same course.

Lastly and most disturbing of all came a request from the Government to catch the first steamer for Australia, and proceed no further with the flight plans. In all of these appeals the tragedy of the Dole fliers was emphasized, and a genuine fear tinged the messages that we would meet with no better fate than those gallant fliers who went to their deaths in that waste of water between San Francisco and the Hawaiian Islands.

In the midst of this massing of the dark clouds came one ray of real sunshine. It reached us in the form of a cable message from the Returned Soldiers and Sailors' Imperial League of Sydney. It was a cheery little message that advised us in the welter of appeals for our return to "keep on keeping on."

We were deeply grateful for that message, which breathed unshaken confidence in us, and in the feasibility of what we were seeking to do.

We accepted the advice of the Diggers. We decided "to keep on keeping on."

CHAPTER IV

WE TAKE OVER THE FOKKER. MORE FINANCIAL WORRIES. MORTGAGE ON THE MACHINE. WE ABANDON THE PROJECT. LIFTING OF THE CLOUDS. CAPTAIN HANCOCK'S GENEROSITY. DETAILS OF PLANE.

WHEN Smith took the plane over in Seattle it was found that the estimates that had been given us of the cost of installing the new petrol tanks and making other adjustments to the machine had been greatly exceeded. This was a serious matter with us at the time, because every dollar counted. We were heavily committed financially.

However, we pushed on with our plans, and decided to engage an experienced American test flier to coöperate with Smith in the first tests of the machine. In this we were extremely fortunate in securing the services of Lieutenant George R. Pond, who had hundreds of hours' experience of flying this type of plane.

Anderson, at this juncture, returned from his mission to Hawaii. His report was that Wheeler Field was an excellent place to land, but that Barking Sands was vastly superior for "taking-off." There was ample room for our take-off needs.

In San Francisco, Ulm had many interviews with individuals and companies in that still tense quest for financial backing necessary to meet the numerous calls that were now being made in the equipping of the machine. We had decided to take with us every possible instrument that would assist both our flying and navigation. We ordered them in 'Frisco, and our money commitments were extended.

At that moment we needed in all about 10,000 dollars. We had been given to understand that this amount would be forthcoming from the guarantee of the New South Wales Government, which had been increased from £3,500 to £4,500, and from other sources. But again, just as we seemed to be on the rising tide of success, came a new convulsion.

News reached us from Australia that the State elections had resulted in a change of Government. The new Government, we were told, had decided that it would not advance or guarantee any further sums. This was a piece of intelligence that tumbled all our financial hopes in a chaos.

On its heels developed a new complication. Sir George Wilkins was making ready for his Polar flight from Point Barrow. He needed money to complete the payments on the plane in which he proposed to make the flight. We were still his debtors to the extent of 7,500 dollars, being half of the price that we agreed to pay him for the Fokker. Sir George Wilkins had been most generous in his dealings with us. We felt that we could not possibly let him down in the payments on the machine he was buying, and we felt, too, that we must let him have at the earliest moment the 7,500 dollars that we still owed him. But where was the money to come from?

We found ourselves in a position that was little short of being a dilemma.

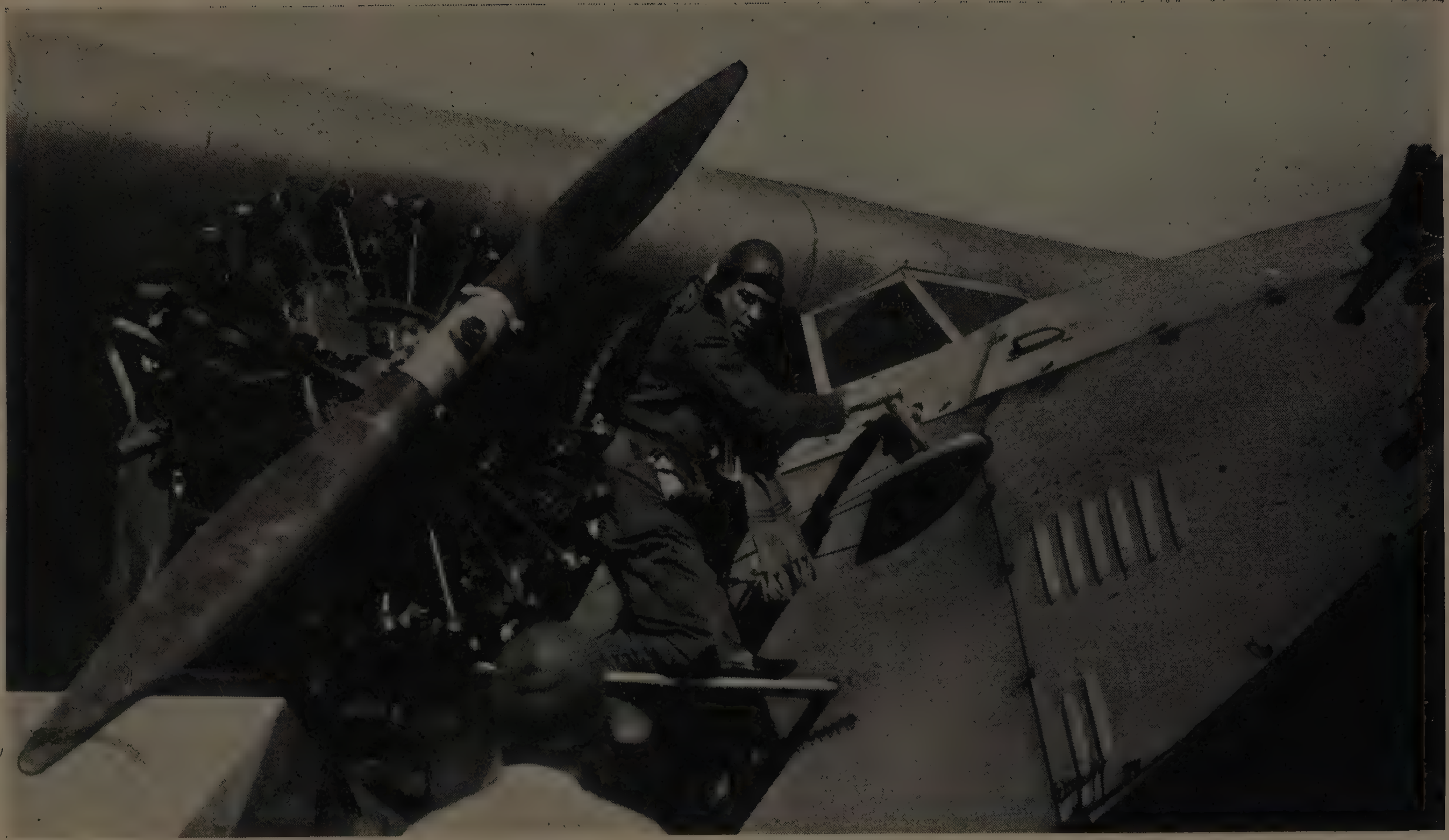
Smith, with Pond, flew the plane from Seattle, and in San Francisco the three of us had a very anxious conference on finance. We were in a most difficult fix. There seemed no immediate way out of the impasse. We had to secure money, and secure it at the earliest moment. In an effort to improve the financial outlook we entered into a contract with an Oil Company in California to endeavor to break the world's record for sustained flight. This then stood at 52 hours 22 minutes, established in a German Junkers plane. Before we could attack this record various slight alterations and adjustments to the machine were needed. To have these changes made, the machine was flown from San Francisco to Santa Monica, near Los Angeles. There the work was carried out by the Douglas Company, manufacturers of the American Army round-the-world air cruisers. It consisted in the main of the fitting of new stub axles and specially constructed wheels. Ulm stayed in 'Frisco to make another effort to grapple with that eternal problem of finance.

Before the projected endurance flight was begun, and before any money had been derived from this source, it became imperative to pay Sir George Wilkins the second half of the purchase price of the Fokker, so that he might be able to pay for his North Pole plane. At this critical point in our affairs a friend in need came to our help. He was our very good pal, Locke Harper, who loaned us 7,500 dollars, the amount needed for that half payment.

This was a temporary loan, and in order that we might repay Mr. Harper, we secured a mortgage over the machine. In this matter we had the valuable help of another good friend, Mr. George T. Cameron, one of the owners of the "San Francisco Chronicle." After these negotiations we had just enough money to pay Sir George Wilkins the 7,500 dollars. We had nothing to meet the accumulating salaries of our employees, yet they stuck to us in the staunchest possible way in the midst of these difficulties.

Then followed the two endurance non-stop flights of 49 hours 27 minutes and 50 hours 7 minutes, to which reference is made in the next chapter.

The New Year held no promise of the good fortune that was later to come our way. In January,



ULM DESCENDING FROM THE COCKPIT

Ulm and Kingsford-Smith donned heavy flying suits for their work in the exposed cockpit, while Lyon and Warner, in the cabin, wore ordinary clothes.

CHARLES T. P. ULM

Flight-Lieutenant Charles T. P. Ulm, co-commander, with Kingsford-Smith, of the Transpacific Flight and Relief Pilot of the "Southern Cross."

CHARLES E. KINGSFORD-SMITH

Squadron-Leader Charles E. Kingsford-Smith, Skipper of the "Southern Cross" and one of the world's most efficient pilots.

Jim Warner, Radio Operator who maintained communications with the world during the Transpacific Flight.

Harry Lyon, Navigator, whose unfailing good spirits as well as his technical skill aided so materially in the successful completion of the great adventure.

THE AMERICANS

1928, Locke Harper told us that the Vacuum Oil Company, of which he was agent in the West Coast of America, had been informed by the new Premier of New South Wales, Mr. Bavin, of the desire of the Government that we should sell the plane and abandon the flight. Under pressure from the Government and our creditors in America, we agreed to abandon the flight as requested, and a cablegram to that effect was sent to the Premier of New South Wales. We confirmed this by a letter to him that was dated January 17, 1928.

And so ended our first endeavor to span the Pacific by air. Adverse circumstances then beyond our control had dictated the step.

Because we could not raise train fares, we flew to Los Angeles. There we sought to arrange the sale of the plane to the Union Oil Company of California. We were prepared to fly to Australia as employees of the Company, but the negotiations broke down, and our finances were in a desperate state. Yet, the blackest hour is that just before the dawn. It was so with us.

In the middle of March appeared the silver lining to our financial storm clouds. At the Rogers' Airport, near Los Angeles, one day when the outlook was at its blackest, Mr. Andrew Chaffey, President of the Californian Bank of Los Angeles, introduced us to Captain G. Allan Hancock. We met a man who was intensely interested in navigation. He was himself a Master Mariner, and was a practical man, who could discuss the subject with a certain amount of authority. He chatted with us about our plans, and particularly the navigation side of the flight that still seemed to be far off. We left Captain Hancock with the feeling that like so many casual acquaintances, very probably we would never see him again.

But we were to be pleasantly disillusioned on this point. Though we did not know it at the moment, that morning at the Airport we met a man who was to become one of our staunchest friends.

Two days later, Mr. Chaffey brought us the surprising piece of intelligence that Captain Hancock was about to begin a twelve days' cruise to Mexico in his palatial steam yacht, and had stated that if we could spare the time he would like to have us as his guests.

There is no question that that invitation marked the turning point in our fortunes. For some weeks, we had been seeking to sell the machine, so that we might be enabled to satisfy our American creditors. We received five or six different offers for the purchase of the plane. These were all fairly substantial offers, but they did not altogether reach the figure that we needed to pay off the whole of our creditors.

We found ourselves in a desperately awkward position.

Some weeks earlier we had been obliged by the New South Wales Government to abandon the flight definitely. Now the thought began to course through our minds, "would Captain Hancock buy the plane?"

We had not the hardihood to approach the subject directly. We decided not to ask him.

We knew that he had large ranching interest, both in Mexico and in California. An idea came to us that Captain Hancock might find the Fokker extremely useful for long flights between Mexico and California to look over his various ranches. If he did, we hoped, further, that he would give us a job flying the plane for him. In this way we would have employment in America that would enable us to stay in the country and to make further efforts to secure finance for a new flight. In spite of our many setbacks we had lost none of our old ambition to do that flight. These were our hopes when we stepped aboard the "Oaxaca," the luxuriously-appointed steam yacht of Captain Hancock. But it was a long time before we had the courage even to mention how really useful the large Fokker could be to him.

Captain Hancock is a prince of hosts. He treated us in a really wonderful way on that delightful trip down to Cape San Lucas and across the Gulf to

Mazatlan. From that point the Captain took us on a motoring tour to see the great ranch property and brickworks, which were his chief interests on the Mexican Gulf.

In that wonderful week at Mazatlan we swam and raced about the harbor in Captain Hancock's speed boat that could touch forty knots. On the "Oaxaca," which was a yacht of 1,400 tons, we were able to indulge our mutual interest in navigation. The yacht was fitted with as fine a set of navigation instruments as one could find anywhere. So it was that we had much practice with the Sextant, taking observations with our own Sextant, and comparing the results of the shots with those of the yacht's instruments.

Captain Hancock showed a sincere and intense interest in the plans that we had made, our safety measures, and the story of our many negotiations that led to our then harassing position. He asked us many questions, and in the course of these chats we did mention to him the advisability of his having a plane to inspect his interests in California and Mexico. But we carefully refrained from pushing the claims of our Fokker.

Two days before we landed on the return from that amazing trip we sat in the chart room of the yacht talking navigation with Captain Hancock.

Suddenly he asked us what were our plans, and how much money did we need to get us out of our unenviable position. We told him frankly that we needed 16,000 dollars to solve the problem.

Then came the light in the darkness.

"I'll buy the machine from you, boys," said Captain Hancock. "I'll see my attorneys and decide what is the best method to follow in doing it."

In thirty seconds we were elevated from a listless sort of gloom about the flight prospects to a wild elation. The flight now no longer would be just an unrealized dream. Our long preparation and work would not be all in vain.

We left the "Oaxaca" on April 2nd, 1928. When we hastened to inquire after the welfare of the plane we learned that it had been seized by the mortgagee's attorneys, and had been taken to another airport. On the following day Captain Hancock bought the machine, and told us the very welcome news that he would allow us to fly it to Australia. He had paid for it a sum sufficient to free us of all our local liabilities, and he had set our ambition flaming as brightly as ever.

A few days later, after legal formalities had been adjusted, we began to make the machine ready for the big flight. A new fabric cover for the fuselage was needed, and certain reconditioning work had to be done on the wing. Captain Hancock suggested that a complete film of the flight be made, and he made an advance to us against this film sufficient to enable us to pay for the reconditioning of the ship, and to meet our current living expenses.

Briefly, that is the story of the amazing turn of the tide in our fortunes at the eleventh hour. But Captain Hancock capped all this generosity in a wonderful way.

On our arrival in Australia we received the following cable from him.

> "I am delivering to the California Bank at Los Angeles for transmission to the Commercial Banking Company of Sydney, Bill of Sale transferring to Kingsford-Smith and Ulm the 'Southern Cross,' together with release and discharge of all your indebtedness to me. I beg you to accept this gift as a token of our mutual friendship, and as my tribute to you and the 'Southern Cross,' and also to commemorate the magnificent achievement of yourselves and brave American companions in bringing our two great countries closer together. Andrew Chaffey joins me in saying 'Advance Australia.'
>
> "G. ALLAN HANCOCK."

A word or two we think is permissible about the plane that had figured in the whole drama of finance, the plane, the title of which we were forced to lose, and which is now our own property.

The "Southern Cross" is a tri-motor Fokker monoplane. The span of the wing is 71 feet 8½ inches, and it is of full cantilever (internally braced) three-ply wood construction. The maximum chord of the wing is 12 feet 6 inches, and the maximum depth (thickness) is 33 inches. We removed a 300-gallon petrol tank from the fuselage, and now have tanks sufficient to carry 1,298 American gallons.

There are four tanks in the wing itself, each holding 96 gallons—one tank under the pilots' seats holding 107 gallons, and one (main) tank in the fuselage holding 807 gallons.

The plane is equipped with three Wright Whirlwind J5C engines, each of 220 horse-power, the oil tanks for these being installed one in each engine nacelle.

At full throttle the engines give 1,800 r.p.m., giving us a high speed of 120 miles per hour.

With the engines throttled back to 1,650 r.p.m., we have a speed of 94 statute miles an hour; at this speed each engine consumes about eleven gallons of fuel per hour. For the purpose of still another safety margin we estimated our air speed at only 90 m.p.h. at 1,650 r.p.m. engine speed.

At 90 m.p.h., allowing a fuel consumption of 32 gallons per hour, we had a range of 3,818 miles, which in still air, we estimated, would give us a range margin of 690 miles, or 22 per cent., as our longest flight from Kauai in the Hawaiian Islands to Suva in the Fiji Islands was 3,128 miles.

And the custodian of these engines!

What a debt of gratitude we owe to Mr. C. C. Maidment, service engineer of the Wright Aeronautical Corporation on the West Coast of America. Mr. Maidment overhauled the engines before we left San Francisco, and later came to Australia and took them down again at Richmond Aerodrome. Mr. Maidment is a wizard among airplane engines. He had had a distinguished career in aviation. He served in the Great War from January, 1916, to February, 1919, in the Royal Flying Corps, with the rank of Flight Sergeant. He served in Squadron 45 of the Royal Air Force, in which were also Captain Howell, D.S.O., D.F.C., A.F.C., and Captain Courtney, the well-known R.A.F. test pilot.

During the War, Mr. Maidment acquired complete experience on all the Allied war type of aero engines. In April, 1919, he went to America with the well-known British pilot, Captain James, to service his engines for the flight for which Captain James later won the Pulitzer Trophy. Captain James was later lost while flying from Boston to Atlantic City. Because of his outstanding ability as an engineer, many responsible commissions for servicing airplane engines have come his way. He was in charge of the installation of the six 450 horse-power Liberty engines in the American Barling Bomber plane. Early in 1927, Mr. Maidment joined the Wright Aeronautical Corporation as Service Engineer. In July of the same year he accompanied Colonel Charles Lindbergh on his flight, calling at every State in the United States, as engineer, staying with him until October, 1927.

It is remarkable to note that Lindbergh called at ninety-two cities in the United States of America, where he was scheduled to arrive on each occasion at 2 P.M. Only once did he fail to keep this schedule, and this failure was because the aerodrome was shut in by fog.

With Mr. Maidment servicing our engines we felt that they were in most capable hands.

At this time our old colleague, Keith Anderson, was in Australia. We wanted him to make the trip with us, and we sent him a cable message to that effect. So that he might have time to return from Australia, we asked Captain Hancock for permission to delay the start of the flight till the end of May, 1928. To this he gladly agreed.

After the reconditioning of the plane had been completed at the Douglas Factory, we made two or three test flights at Clover Field, Santa Monica. Then we flew the plane to San Francisco to have the radio equipment installed, to receive our navigation instruments and to have the compasses swung. The swinging of the compasses was a long and intricate job. It was done by another good friend of ours, Captain J. T. McMillan, Chief of the United States Hydrographic Office in San Francisco. Captain McMillan was one of the most staunch believers in our success. He is an authority on navigation, and it was through his good offices that we secured the services of Harry Lyon. Through Harry we came into contact with Jim Warner, the radio man.

With Captain Hancock occupying Ulm's seat in the cockpit, and with Ulm in the navigation cabin, we flew the "Southern Cross" from San Francisco to Los Angeles. It was the first flight in the "Southern Cross" by Lyon and Warner, and Ulm sat in the navigating cabin to note how they reacted to air conditions. He was eminently satisfied with their work in the air. Then to accustom the four of us to working as a team we had several more flights at Los Angeles.

In these we applied ourselves to the problem of communication between the cockpit and the navigating cabin. We first installed an electric telephone system between these two compartments of the plane. We gave it tests without number, but found that it was unsatisfactory. Our deafness after several hours' of the roar of those motors got so bad that we used to shout into the phone with all our might, and yet could get no response one from another. Our ears were plugged with cotton wool, but the deafening effect of the engines' pound seemed to get right into the bones at the sides of the forehead. Later, when we got better attuned to the telephone, it was necessary to repeat every word many times, and even then there was always the danger of its being lost. In a vital message touching a problem of navigation this could have led to serious complications. So we abandoned our telephone system.

We reverted to the somewhat primitive but not inefficient plan of exchanging penciled notes. Ulm strung a piece of cardboard as a kind of pendulum to be dropped into the navigating cabin from the cockpit when a message was about to be passed through. Lyon facetiously called this cardboard pendulum "Ulm's patent annunciator."

On May 23rd we made our official start on the Pacific Flight from Los Angeles. At our request, Captain Hancock flew to Oakland in Ulm's seat in the cockpit. In the navigating cabin were W. V. D. Kelly, a cinema photographer, and Joe H. Chapman, one of Captain Hancock's secretaries. The Captain handled the controls for an hour, and for a beginner did well.

James H. Fort, vice-president of Fageol Motors Company, who was one of our best friends and advisors, arranged that we should be the guests of the Chamber of Commerce at Oakland, and we were accommodated at the Oakland Hotel. All the facilities of the Airport were placed at our disposal free of charge, which was greatly appreciated, as our resources in ready cash were particularly slender.

In the last few days before the big flight we carried out a series of coördination tests. In these tests we took off from the runway at Oakland Airport exactly as we proposed to take off on the actual flight. We dashed out over the Golden Gate, and forty or fifty miles out to sea picked up the radio beam signals, turned back towards Oakland, picked up the beacon again, and found that the instruments were working perfectly.

And so, on May 31st, we were ready to start.

CHAPTER V

MANY PROBLEMS. FINANCIAL WORRIES. IMPORTANT POINTS LEARNED. NAVIGATION PLANS. BLIND FLYING. INSTRUMENTS. SAFETY DEVICES.

WE had been criticized by practically all airmen in Australia for not having decided on a flying boat, amphibian, or seaplane, but the first problem that confronted us whichever route we took, was a flight of over 2,400 statute miles, and unless we had been able to purchase what was for us a very expensive craft, we could not have secured a flying boat or amphibian capable of even making this first stage.

We planned to make a one hundred per cent. successful flight—not to start out and be forced to land through lack of fuel, and then (perhaps) stay afloat and be towed to port.

The subjects of "Blind Flying" and "Heavy Load Flying" were comparatively new. We ourselves were almost as ignorant of them as most other Australian airmen until we arrived in America and studied them. On our arrival in America we were ignorant of the importance in blind flying of such modern flying instruments as the Bank and Turn Indicator, Rate of

Climb Meter, Earth Inductor Compass, etc., and did not then truly appreciate all the difficulties ahead of us. We gradually knew the difficulties and problems with which we might meet, and planned and organized to meet them all, so far as was humanly possible.

"Blind Flying" means the pilot's ability to fly the plane efficiently when in total darkness, only the instrument board being visible to him. Simple medical tests and personal demonstrations readily prove that in such a condition of total darkness a human being's sense of direction is absolutely useless. No one can fly blind for more than about an hour or so, without the aid of special flying instruments. A plane in flight can move in any of three directions: (1) Up and down (longitudinally); (2) Banking (laterally); and (3) Turning. Sensitive instruments have been devised which tell the pilot whether or not his plane is moving in all or any of these directions.

The Bank Indicator registers accurately whether the plane is banking to port or starboard. The Turn Indicator registers the slightest turning movement. The Rate of Climb Meter (which is really a supersensitive altimeter) registers small changes in altitude (up or down) and feet per minute of ascent or descent.

When a pilot can train himself to fly for hours on end by these instruments and others provided, without seeing anything else—then and then only is he "safe" to pilot a plane over long stretches of water. This training in instrument flying or blind flying is ninety per cent. mental. The pilot must have implicit faith in the instruments; he must know that, if those instruments register at variance with his senses, then his senses are wrong and the instruments are right.

When flying through heavy clouds, and (or) thick fog, the pilot is "blind"—he can see nothing else but his instrument board, and if he cannot "fly blind" in a short time he will lose control of the plane.

On the question of "Heavy Load Flying" there were two main factors to be studied, and they were cared for, in the main, in the design of the plane. They were: (a) Wing loading (being the amount of gross load carried to a square foot of available wing surface), and (b) power loading (being the gross load carried per available horsepower), the sum of these being usually referred to as "Composite loading."

Every one realizes, of course, that there is a limit to which a plane can be "composite loaded," and then flown, and we knew something of this subject, as we had, after several "building up" load tests, established a new world's record for "composite loading."

To give an idea of the amount of research work required on this subject alone, we would point out that when we broke the Around-Australia-Record in July, 1927, our plane was overloaded, and our wing loading was about 7.8 pounds per square foot, and our power loading about 14.2 pounds per horsepower, giving a composite loading of 22 pounds. (These figures are only from memory.)

We established a world's record with a composite loading of 49.2 pounds. The plane was, of course, overloaded, but it flew, and with this gross load (15,807 pounds) created a world record for sustained flight in multi-engined heavier-than-air craft by staying aloft for 59 hours 7 minutes.

We would say here that one of the many reasons why we decided on a Fokker plane was the fact that the then world's record for composite loading was established by a Fokker plane (Kelly and McCready's United States Transcontinental Flight, with composite loading of 47 pounds). For, naturally, one of the first essentials in choosing a plane for a long non-stop flight is its capacity to lift and efficiently fly with a load of petrol sufficient to enable it to reach its destination, and yet have a margin.

Every airplane that has ever embarked on long non-stop flights of 2,000 miles or over has been "overloaded"—and overloaded meaning the carrying of a load greater than that for which it was designed to carry with the required normal safety factors. We know of no plane in the world to-day that is designed and constructed to carry a petrol load sufficient to give it a non-stop range of 2,900 miles without overloading.

Our first problem was, irrespective of the remainder of our route, to secure a plane that would do this.

In any type of plane chosen we had to sacrifice some proportion of the factors of safety designed for.

It is all a matter of compromise, and the nature of the compromise must be decided by the type of flight the plane is to be used for. Some prefer a high "power loading" and comparatively lower "wing loading," the result being a plane with a large lifting surface (wing) and relatively smaller power plant, which, as a whole, results in a slow air speed, a good range in hours, but a poor range in miles.

On our trans-Pacific flight we needed range in miles, not range in hours. We had to determine the most economical speed at which to run our engines to enable us to fly the greatest number of miles, not hours.

The third factor in heavy load flying is controllability—for it has been proved that it is possible to "take-off" with a plane so heavily loaded that it will not fly. This may sound strange, but the facts are as given in the following instance. Given a long enough runway, it would be possible to take off our plane loaded to, say, 17,500 pounds. The plane would, for instance, rise off the ground and be flying, but while so heavily loaded would not be able to gain an altitude greater than approximately the span of its wing (in this case 72 feet), and the slightest roughness of the air causing a "bump" would throw the plane out of control, and, being so close to the earth, a crash would be inevitable. Sheer flying skill could not avert a crash in a case such as this.

Innumerable "building up" load test flights were made carrying 60 per cent., 70 per cent., 80 per cent., 90 per cent., 95 per cent., 100 per cent., and up to about 110 per cent. of the ultimate gross load we needed on any stage of the flight to Australia.

As an instance of the thought and care to be exercized in organizing these test flights alone, we will mention that before the third one hundred per cent. load test flight was made, we had to redesign the rudder, strengthen the whole tail end of fuselage, fit extra vertical members at points of great stress in fuselage, install special flexible petrol pipes, which were immune from vibration, redesign and make stronger axles, and have specially strong wheels and tires designed and built, etc., and over 3,400 gallons of petrol were "dumped" in the air, so that the plane would not be subjected to undue strain when landing heavily loaded. The result was that we never had even a minor accident in all these tests in which the equipment was throughout overloaded.

On one of these flights the petrol alone weighed the equivalent of 57 men each of 160 pounds.

The foregoing is intended to show that we knew we had the right plane to fly efficiently with sufficient fuel and oil to carry us over the three long non-stop flights we had to make, and that Kingsford-Smith had the experience and ability to fly those loads of petrol and supplies off the ground.

We had to devote the greater part of our time to our worst enemy, "lack of cash," and in dealing with this difficulty, we had, whilst endeavoring to satisfy every one's desires, kept as our objective the "flight across the Pacific."

We will not bore you with many details of our financial worries (they were many) beyond repeating that, backed by our State Government, we arrived in the United States with sufficient funds, £3,500, to purchase a single-engined plane and fly home. After studying the types of single-engined planes available, as illustrated in Dole Race competitors, we knew that there was hardly a fifty-fifty chance of our being successful in one of them. Wilkins' tri-motor Fokker plane was available without engines, radio, any instruments or general equipment, for about £3,700. We decided that it was the best plane available in the United States at the time, so we purchased it. Since that date, October, 1927, our big fight was not to lose title of the plane and equipment, but, eventually, under pressure from the Government and our creditors in America, we were forced to sell the whole equipment.

Thus ended one endeavor to span the Pacific Ocean by air.

However, after the sale, we secured backing in Los Angeles, enabling us to re-purchase the plane and equipment and re-condition same to make the flight. So we were ready for our second attempt to fly from the United States to Australia.

Navigation of the craft is, of course, one of the very main essentials in ocean flying, for it would, naturally, be quite useless to have the best plane and pilots in the world without some one to navigate them accurately to the desired destination.

Air navigation has its own peculiar problems as against ordinary nautical navigation. The chief of these is the plane's high rate of drift, as compared with the sea-going vessel. Ocean currents seldom cause a vessel to drift off its course at more than three or four miles an hour, but with the aircraft the drift can be as high as 60 or 70 miles an hour.

On the other hand, by virtue of the airplane's much greater range of visibility, the same degree of accuracy required in nautical navigation is not essential in the air. The seaman must be able accurately to navigate his craft within a mile or two of shoals or rocks, but the airman has none of these dangers. Also, the seaman's range of vision is limited to a comparatively few miles, whereas the airman can, in fair weather, see his objective a hundred miles or more away.

Navigation equipment and methods vary with each individual flight. Flights may succeed with minimum equipment and preparation.

The meteorologist's help is important. In cases such as ours, when latitude is permitted in the time of starting a flight, the advice of a meteorologist on the proper time to take off is very valuable. By the position of the isobars, it is possible to estimate roughly both the speed and direction of the wind, and thus to make approximate correction for drift. There is a case on record (March, 1924) where a United States Army airplane flew from New York City to Dayton, Ohio, over a double layer of clouds that effectively prevented drift measurements. A study of the weather map enabled the navigator to guess at the probable wind changes en route, so that in spite of a fifty-mile an hour gale, the airmen were only

12 miles north of their course on reaching their journey's end.

The methods of air navigation may be divided into three main classes, that is, dead reckoning, astronomical navigation, and navigation by the aid of radio.

The brain work of navigation never can become subconscious so that it affects efficiency. Therefore, it is wise that the air navigator has every possible source of information available about his position.

The term "dead reckoning" involves flying a compass course corrected for the compass errors, and for the effect of wind drift. Flying by dead reckoning is contingent on an accurate, reliable compass, and proper drift and ground speed knowledge. On the "Southern Cross" we were carrying four compasses, a Master Compass and three Steering Compasses. The Master Compass is an Aperiodic Compass, with a large bowl, and is mounted on a non-magnetic tripod in the navigator's cockpit. For steering, we used the Earth Inductor Compass and two magnetic Needle Compasses.

Great care was taken in swinging these compasses before the take-off. As our plane structure was liable to become magnetized in flight, a pelorus was mounted, so that checks on the compass could be made in flight from the sun's azimuth.

Instruments for measuring drift that we carried were the Pioneer Speed and Drift Meter and a Pelorus Drift Indicator, the latter being of recent design, and not then in general production. We also carried two kinds of bombs, one giving off smoke for daytime use, the other giving a bright light for night use. These were dropped from the plane to float on the water, and sights were taken after they had been left a couple of miles astern. Without these it is possible, but not so reliable, to utilize the foam flakes of the breaking waves.

Of course, for astronomical navigation the Sextant is the crux of the whole situation. If the Sextant shot obtained is at all reliable, and an accurate position determined, this is a most valuable means of obtaining drift correction, for it summates all the errors in the course flown up to the time of taking the sight.

When the true horizon can be used, astronomical navigation of aircraft approaches the reliability and accuracy of that of a marine vessel. Unfortunately, too often the sea horizon cannot be used on trans-oceanic flights, and an artificial horizon attachment has been designed for use in aircraft, but on account of its sensitivity it is not as accurate as is desired. A Sextant for use on an airplane must be as light as possible and compact. It is often necessary to hold the Sextant in the slip stream, and the user must grip it tightly to prevent the instrument being torn from his grasp.

The artificial horizon attachment is in the form of a spirit level, and even under favorable conditions the bubble is constantly moving. With the true, or sea, horizon, the observer is measuring the angular distance between two fixed points, but with an artificial horizon, the attempt is made to measure the angular distance between one fixed and one moving point.

Of course, the Sextant's work is over after the altitude of a celestial body has been measured, and then certain computations must be made before the line of position can be plotted on the chart. The most commonly used method of reducing observations at sea involves some eleven positions, including the extracting of value from tables. These and other shorter methods are used in the air. Our navigator, Harry Lyon, used the Mark St. Hilare method.

The importance of radio as an aid to air navigation is growing. Radio has been successfully used in three different ways, viz.: (1) by taking bearing on transmitting stations; (2) by transmitting signals for boats to use in taking bearings that are radioed back to the aircraft; and (3) through the radio beacon. Our radio equipment was especially designed for use in the two last of these ways.

From the foregoing very brief explanation of some of our navigation problems, it will be seen that the navigation of an airplane over long stretches of water is by no means a one-man job. We took with us Harry Lyon, a skilled marine navigator. That we chose an excellent man is evidenced by the fact that we are here to tell the tale.

Whilst the chances of being forced down at sea were, in our case, very remote, we did practically everything possible to insure our safety should this have occurred. The whole of the 72-foot wing is of entirely wooden construction, and in itself was sufficient to have kept the craft afloat. In addition to this, a special dump valve had been fitted to the main tank (807 gallons capacity), and the whole of the contents of this tank could have been dumped in fifty seconds, and the dump-valve re-sealed, thus giving extra flotation. Steel and wood saws were carried, so that if we had been forced down at sea we could have cut off the outboard motors and the whole of the fuselage, which is of steel construction, and used the wing alone for our flotation.

Emergency rations were carried in the wing, and we had a special still made in which we could condense more than sufficient water to keep us alive. Our navigation instruments and nautical tables were kept with us, so that we could whilst floating on the wing determine our position from time to time. Our biggest safety factor was a special emergency radio transmitter, which was completely water tight. The aerial for this transmitter could have been lifted by means of a kite or gas balloon, three or four of which we carried. This emergency transmitter is battery actuated, the rest of our radio equipment being operated from two air-driven generators of 50 watts each.

In touching on this question of being forced down at sea, we would explain that if one of our engines had been cut out completely at any stage of our flight, we could have reached inhabited land with the remaining two engines only running. Had two engines failed completely, we could have stayed in the air for some hours and flown a distance of from 100 to 300 miles. Statistics covering the operation of three-engined aircraft, such as ours, show that a forced landing is occasioned by engine trouble once in every 1,600,000 miles flown (average).

We would remark here that although we used a land plane, we would not for a moment say that a land plane is the ideal type to be used in flying over long stretches of water. The ideal type is an amphibian, powered with either three or four engines. There is no good ship of this type suitable for our needs in production at present, although one or two are on the way. The main reason that we did not use an amphibian plane was the question of cost. A plane of the type just mentioned would probably cost in the vicinity of £20,000.

Our radio equipment had been praised by every expert on the West Coast of America, and was declared to be the finest ever installed in aircraft. We could send and receive to both long and short wave lengths. The short wave equipment was used mostly for communication with shore stations, and the long wave for the reception of the radio beacon signals and communication with vessels at sea, securing radio bearings, etc.

The foregoing very briefly endeavors to illustrate that we knew we had the right plane and equipment to start with, that we, as the co-commanders, had the ability and experience successfully to fly the plane off the ground, and thereafter handle her during the hazardous (heavily loaded) period of the first few hours of the flight; that our navigator had the necessary equipment and experience competently to navigate the craft over the whole of the route, and that every possible precaution had been taken to insure general safety.

The next question was "can the crew efficiently fly the plane for thirty-five or thirty-six hours non-stop?" We knew the answer to be in the affirmative.

It was largely a matter of physical and mental endurance for the pilots and for the navigator and wireless operator.

We would be seated in comfortable seats side by side, and our cockpit nearly totally enclosed during the flight. Complete dual control was fitted, and although we could not, when off duty, lie down full length, we could "stretch out" horizontally and get a fair amount of rest. The one off duty could stand up to his full height, which was a great relief, a change being often as good as a rest. No fixed hours of "on and off duty" were kept by us, one handing over the controls to the other when we felt we needed a rest.

The navigator and wireless operator were, so far as comfort is concerned, much better off than we were. The navigator's cabin being six feet high by five feet six inches wide by eight feet three inches long. Therefore, although we had a large chart table installed, and the radio equipment took up quite some space, the main area of the floor was available for them to lie down full length and rest in this position when off duty. Of course, there were times when they had to stick to their job very closely, and could not seek any rest.

We had previously proved to ourselves that we could remain "on duty" and alertly efficient for more than the required thirty-six hours without a spell.

Kingsford-Smith, as every one knows, then had over 3,300 actual flying hours to his credit on practically all types of planes, under practically all types of conditions. His then recent experience flying the tri-motor Fokker (with Lieutenant Pond as co-pilot) on non-stop flights of 49 hours 27 minutes and 50 hours 7 minutes, had given him not only a thorough knowledge of this type of plane, but a supreme confidence in her capacity to fly heavily loaded, and in his own ability to "stay on the job" efficiently for a greater length of time than we required on any stage of our trans-Pacific flight.

We well knew that Ulm had the endurance for the job we undertook. We remember having worked and flown for thirteen days (in connection with, and during our Round-Australia flight), averaging only two or three hours' sleep a night, and on one occasion (Port Darwin to Manilya Station) having been forced to keep awake and efficiently on the job for thirty-nine hours without sleep, and under far more trying conditions than we then expected to experience on our trans-Pacific flight.

In addition to our previous and then present experience (technical, physical and mental) we were both in strict training—and occasionally tested ourselves out by driving an automobile for, say, twelve or fifteen hours, then flying three or four hours, then running for an hour or two, then flying some more, and then more automobile driving, etc., for a total of thirty-five or forty hours on end, until we knew the "human element" would not "let us down."

Part Two: OAKLAND TO HONOLULU

CHAPTER VI

WE TAKE OFF FROM OAKLAND. THE GODS SMILE ON US. TRAGEDY OF OUR FLAG. WE FACE A LEADEN OCEAN AND A FANTASTIC CLOUD WORLD.

GRAY curtains of mist trailed across the Golden Gate as we climbed into the cockpit of the "Southern Cross" on the morning of May 31st. It enshrouded the wharves and steamers, and hung along the sea horizon in a leaden pall. A light wind sifting across San Francisco favored us, as it was slightly offshore. Meteorologically, the conditions ahead were kind, and we faced the first long hop of the flight with a quiet confidence. Nothing had been left to chance. We felt that every possible contingency had been forestalled in as far as it was humanly possible to look into the future. Every terror of wind and tempest had been considered, and we had implicit trust in the stoutness of our ship. Our faith in the power of those motors to thrash through any tropical storm that might leap on us on the long ocean trail was unbounded. Heroics we felt were never less appropriate. We did not look on the venture ahead as being in any sense a dicing against death. Reflections of that kind did not oppress any of the four of us.

It was no stunt that we essayed, but a calm, considered plan to show the world that ocean flying in long hops was a normal development of aviation, and that given the proper organization and equipment it ceased to be a desperate gamble. We had before us a schedule of flying, and with some justice, we considered we had the most efficient equipment with which to carry out that schedule. Only the burning of gasoline at too rapid a rate, we felt, was the one factor that might have disturbed our schedule. To us the "Southern Cross" was, so to speak, a Valkyrie that could ride the storm so long as those motors could be fed with fuel. We were not animated by any spirit of bravado, nor were we unduly disturbed by doubts or misgivings.

Our aim was to show the world that the Pacific could be spanned by air, not by any desperate struggling to land far from our fixed destination or any eleventh hour snatching from disaster, but with a substantial margin of safety. Only a flight carried out with such a margin, we felt, would be of any real scientific value to aviation or would adequately determine what we set out to prove, that a route of communication could be opened across the Pacific. To struggle feverishly to perhaps a haphazard landing was not at all the basis of our mission. We planned to fly in three hops from Oakland to Brisbane, and any effort that fell short of that by our losing our course and consuming our gasoline, would to us have been tantamount to failure in our main purpose. If we were to open an airline that would ever be of commercial advantage to America or Australia, it had to be a defined airline, as certain as the route of a steamship, not a wavering airline that might end anywhere between Brisbane and Cape York Peninsula.

Such were our aims when "Doc" Maidment cranked up those three engines at Oakland that morning. Confidence was the dominant note in the whole air expedition, but not boastfulness. We knew that beyond Wheeler Field, Honolulu, we were to face a great sweep of ocean, over which the steady drone of an airplane motor had never been heard. We fully appraised the chances against us on that long unflown 3,100 miles airline to Suva, with its Island landing places that were not such as would add to the peace of mind of any pilot, yet there, beyond Hawaii, lay the charm—the intriguing thrill of the flight for us. Out over that 3,000 miles we were to face what might be termed "virgin air" in tropic conditions that we fully realized would test both the skill and the equipment of the expedition to the utmost. There was mystery beyond the green pinnacle of Mauna Kea and the crater of Mauna Loa, the kind of mystery that called to Magellan far south in the trackless wastes of the same ocean, the same lure of the unknown that led Vasco da Gama round the Cape also over "virgin ocean."

So we were ready to start.

To us that fact alone was the achievement of an ambition both of us had long nurtured, an ambition which many an adverse circumstance had threatened to thwart. We realized with the poet that "joy comes more sweet after pain." For us the pain lay in the influences that seemed to marshal themselves at the most inopportune moments to defeat the great aim of our lives. Thus, it was, when we crawled into the cockpit on that May morning we had realized half of our consuming ambition. Fulfillment of the other half lay out there beyond the barrier of gray fog that girt the Californian Coast.

Several hundred people came to the Airport to see us off. They showered good wishes on us, and among the last to grip Kingsford-Smith by the hand was Mrs. Eichwaldt, mother of Lieutenant Albert Eichwaldt, who perished with W. P. Erwin in searching for Miss Doran after the Dole Race disasters. Mrs. Eichwaldt gave Kingsford-Smith a silver ring that her son had fashioned from a franc piece while he was serving in the World War. For a minute or two the gathering was awed by this affecting incident, but when Kingsford-Smith took his seat at the controls, there was a rush of people anxious for a final handshake. After seeing that everything was O. K. in the after cabin Ulm was the last to enter the plane. The three motors had been warmed up, but as we began to move along the runway the altitude control on the center motor slipped forward. This cut out the center motor after we had run about 800 feet. We stopped all three motors, and re-started without backing again to get the advantage of the full 2,500 feet runway.

It was just 8.54 A.M. when we finally took off. The roar of those three great engines quickly assumed for us the pleasing grandeur of a symphony of great music. Their racket normally grated heavily on the eardrums, but so long as they roared in harmony no Wagnerian chorus could have given us greater pleasure. Right along the big ocean trail our ear for motor rhythm became as exacting as the ear of an orchestral conductor, and never had we cause to be displeased with that symphony that played so near our heads. The steadiness of those motors was a most comforting thing. Night and day they roared on through savage storm and calm, and never was there a semblance of hesitancy in their beat. The prelude that the engines played on the Oakland runway was to us one of the happiest auguries of success. "Keep that steady beat going, you beauties, and we must get through" was how we felt inclined to encourage those motors as if they were living things.

The same encouragement leapt to our lips more than once later as the mighty voice of the motors bayed defiance at the tropic storms that sought to dispute our progress. It was a strident metallic voice that often cut short our dozing on our spells of relief, yet had the tones of those three engines become milder, our cause for sleeplessness would have been infinitely greater.

At the take-off, each of the three motors reached 1,800 revolutions, giving us a take-off speed of 76 knots. We climbed 1,000 feet in seven minutes at 80 knots, and then turned over the City. We flattened out high over the stone and concrete canyons of San Francisco. The spring sunshine touched the towers and skyscrapers with silver, and thousands paused in the streets far below to watch the "Southern Cross" sweep out into the entrance of that ocean airway bound for far-off Australia. The City swiftly slid the other way, and inside twelve minutes the skyscrapers, looking white and spectral, were swallowed up in the gray-brown pall that enshrouded the Golden Gate and the Californian Coast for many miles.

Our last picture of 'Frisco, the City where we had doubted and hoped, but had not despaired, was, as it seemed to stand, baseless and serene, like a magic city hanging in the clouds.

Weather Bureau officials had held out rosy promise for us on the first hop to Honolulu. They announced that the general meteorological conditions would be likely to give us a following wind of a velocity of about sixteen miles an hour for the first 400 miles from the Californian Coast. Greater variability in the wind was promised further out, with light and broken cumulus clouds, until near the Hawaiian Islands. There clear skies and moderate east winds from fifteen to twenty miles would be against us. Not a single disturbance, either actual or developing, was charted over the whole route between San Francisco and the Hawaiian Islands. The elements were indeed kind to us on the first stage of the journey. The Pacific lived up to its traditional name. We encountered an altogether different Pacific beyond Barking Sands, Hawaii, but that is another story.

As we headed out over the Golden Gate, where the morning mists drifted seaward like light smoke, we felt that the gods had smiled on us. Nobody could have wished for a more favorable beginning to a big enterprise. The harbor and the coast drifted behind us in a vast dim map.

Ahead, loomed the gray brown bulk of the Farallone Islands slipping towards us over the steel blue plain of the sea. Kingsford-Smith pointed the nose of our ship out at the immensity of ocean, and snatched a second from his vigilant look-out to shake hands with Ulm in mutual congratulation for our excellent start. In the scurry and bustle before we leapt aloft from the Oakland Airport, some one had given us a tiny silken Australian flag. It was only a minute thing, but it was a reminder of home. We placed it between the petrol gauges, where it fluttered proudly in the morning sun. We would have liked to carry that flag across the Pacific with us, but it was not to be. The wind out off the Californian Coast was ungallant, and did not share our patriotic motives. It tore and tugged and beat the little flag into shreds. None of the party was superstitious, but we felt that we certainly should not strike our flag. So there it stayed till the shreds of silk vanished, and only the pathetic little stick remained.

The Farallone Islands were gray with the mist wreaths. They swept under us and glided astern, dropping down into the mantle of cloud that enfolded the coast. That dim gray bulk was the last land that we were to see for twenty-seven hours.

There was something intriguing, even a little eerie, about that last fading picture of land. We had seen before the whole vast Australian coast unfold itself below our plane, but as the Farallones slipped astern the circumstances were vastly different. We seemed to be leaving the world for a world of our own. For slightly more than a day the world was to live and love and laugh while we hurtled through the air nowhere—through a world of mist as detached from the whirl of life as a hermit in a cave on the most inaccessible mountain on the globe. Before us swept an immensity of silent ocean the color of ashes. We were plunging into a sort of dream world, with neither boundaries nor anything tangible about it. Civilization was behind us, and somewhere vaguely very far ahead of us. Racing between ocean and sky is a far stranger feeling than any steamer voyage. One can find no parallel to communing with cloud banks with the only link with civilization the rhythmic roar of those engines running with the precision of an express train—an uncanny precision. So it was that the feather of surf gleaming round the Farallones held for us a special significance. It was the boundary of the tangible world. Beyond was the fantastic cloud world—a world such as those that figure so much in the pages of mythology.

CHAPTER VII

TALKS ON PAPER. CLIMBING THE CLOUD PEAKS. BANTER PASSES TO AND FRO. WE RIDE AND THEN LOSE THE RADIO BEACON. SAILING IN THE DIM WORLD OF CLOUDS.

WE could neither smoke nor converse during the whole flight. It was necessary for us to write notes when we wanted to communicate with Harry Lyon or Jim Warner in the navigator's cabin behind us. These notes were many, and might have been combined into a vernacular diary of the flight, had they been preserved. Even the penmanship alone told the story of calm and storm, and the bumps and bucks of the ship. There was told also the story of variations in temperature, the steady handwriting of the genial air trailing off into the palsied scrawl with numb fingers when the cold bit into us in the upper levels with a tooth as sharp as the one of which Shakespeare wrote. That tooth of the atmosphere was keenest in the memorable last night of the flight, as atrocious a night as could be conceived even by the pen of a Conrad. When Lyon and Warner wanted to ask us something about either the ship's course, or about wireless, they scribbled notes on the little table in the navigator's cabin and struck them on a pin. This was placed on the end of a stick, which was pushed through to the cockpit and emerged near the backs of our necks. Our replies were scrawled on pages from a notebook, and were passed back into the navigating cabin in the same way. It was a strange experience for four men to sit in such a confined space and so near to one another, and yet be unable to exchange a word.

The terrific roar of the engines would not only have drowned our voices if we sought to speak, but it also caused a temporary deafness, particularly with those in the cockpit, against whose eardrums the incessant roar resounded like hammers. This deafness more than once stayed with us during the first hour after we had left the "Southern Cross" and were trying with only a small measure of success to listen to speeches being given in our honor. So it came about that practically all the wireless messages that crackled their way across the ocean to the listening world were first written on these slips of paper.

It was 9.12 A.M., just eighteen minutes after we had taken off from Oakland that the first radio message was written. At almost the same moment Lyon passed through the first of his many messages to us. It stated that we were making a beautiful course.

Our speed was then 77 knots, and our altitude was 1,500 feet. It was only about five minutes after this that we lost sight of the Farallones at 1,900 feet. Flying conditions were ideal, and at 9.30 A.M. we began to follow that long trail to the rim of the ocean. When a machine bowls along at a speed of nearly 80 knots an hour, it does not take long for a coastline to vanish in the haze, and within three-quarters of an hour's flying we were rushing along over a vast disc of ocean with nothing ahead or astern. In effect, we were riding a radio beacon flung from Crissy Field out over the Pacific behind us as one of our aids to navigation. Radio was our most powerful ally on the flight, and we were glad of this radio buzz that was thrown out from the American coast to be met at its waning by a similar radio beacon flung northeast from Honolulu. We were just chuckling on leaves torn from the notebook on the excellence of the take-off that had confounded some of those who had predicted a crack up with 1,200 gallons of petrol aboard, when Warner sent through a piece of paper on which was written an intimation that we were actually off the radio beacon from the Pacific Coast.

We were steering a little to the north of that comforting radio buzz. We sent a note to Harry Lyon, and his written reply was that he had set a northerly course because of the drift of the ship. We replied advising Lyon to change the course to get back on to the "T" zone of the beacon. We were then speeding forward at 76 knots 1,600 feet above the listless gray sweep of ocean. We gradually worked back on to the "T" zone of the radio beacon, and advised Lyon to keep us on the line of the beacon by moving the Earth Inductor Compass controller. At 9.56 A.M. we were dead on the "T" zone of the beacon. Again we chuckled in satisfaction with pencil and paper. Here was the first vindication of the long and patient efforts we had made to secure the most complete equipment possible. It was worth the care and the trouble, as we had that comfortable feeling of knowing that every one of our special aids to navigation and steering was functioning with perfect precision.

It was 10.07 A.M. when we met the first of the white cloud mountains of which the meteorologists had spoken. Its slopes were easily mastered, and at 2,000 feet we looked down into its valleys and on its ridges. Clouds began to bunch thickly ahead, and we got the first few bumps of the flight. The tonic spring air of Oakland had given place to a colder stratum, and we opened up the motors to 1,750 revolutions to do some more scaling of clouds. An altitude of 2,000 feet carried us clear of the early ranges of clouds that seemed to marshal themselves into a never-ending march eastward. We began to keep a close look-out for the steamer "Makiki," which was the first of the many vessels that had been charted as being close to the line of the radio beacon that we were following. We kept no fixed roster in piloting. We relieved each other at varying intervals, and took the controls for varying intervals. We changed over for the first time at 11 A.M., when Ulm had his first half-hour's spell as pilot.

A little later at 1,700 feet we raced over a drifting white world of clouds. We could not see the ocean, but above us the sky was a blue vault. For two and a half hours we had kept at a steady speed of about 77 knots, and it was then that the monotony began to make itself felt for the first time. We were not exactly cramped in the cockpit. We had sufficient room to lie in a huddled position for a doze. Refreshing sleep was not possible with the continuous roar at our ears. Yet the monotony grew and grew with the passage of the hours, and the lack of incident.

It was then that we passed penciled messages to and fro that were not always concerned with the navigation of the plane. Personal chaff of a forcible kind went back and forth. Some of these notes none of us had the hardihood to keep. The good-humored banter embellished at times by colorful adjectives would not have looked as amusing in cold unsympathetic print. At the time, however, they were as manna from heaven during that long period of monotony the first day out. Were they preserved and collated, they would have been a very definite evidence of the good spirits which animated every member of the party. We had up to then struck no adverse conditions to put us into a less benevolent humor. The plane was running with flawless precision. We were then on the radio beacon, and all was well with the world. So it was that penciled quips from Harry Lyon, a born humorist, were answered from us in the cockpit in much the same strain.

We were still riding a weary monotonous mountain range of cloud at noon when Lyon changed our clock fifteen minutes, and only a quarter of an hour later the drowsy monotony was broken. It was a message from Warner that did it. He told us that he had not heard that comforting buzz of the radio beacon for some time. We were sorry to have lost the friendly beacon, but we were not in the mood for worrying unduly. As we included in our log book, everybody was "as happy as hell." "Wise cracks" were crackling ad lib. That summarized our feelings four hours out of San Francisco, and from 330 to 350 miles on our 2,400 miles' first hop.

A bite was coming into the air, but the three motors that inspired unbounded confidence were running with the rhythm of music.

At 2,600 feet we were well above the rolling cloud banks till 1.12 P.M. Then this vast gray-white cloud world suddenly disintegrated. The whole mass seemed to blow up at us without warning. We opened up the motors, and had our first twenty minutes of blind flying. We ascended to 2,900 feet, but the clouds followed us. Cloud curtains had blotted out the world for us, and although the mist wreaths surrounded us for an hour, we were not flying blind for the whole of that time. It was 2.15 P.M. when we burst out of this gray wilderness and the steel blue plain of the ocean once more opened up before us. Among the cloud ridges we received the first really decided bumps of the flight, and once out of this murky barrier we came down to 1,200 feet.

Now the steel of the sea turned to a vivid turquoise. Not a single fleck of foam marred the endless mirror. The ocean chose to smile benevolently on us, but there were high drifting clouds above, light as thistledown. A gray haze that had blotted out the ocean's rim far ahead, lifted, and the sun shone like hammered brass. The air was as fresh as spiced wine, and we rushed on at 77 knots. All that the weather men back in San Francisco had predicted for us was coming to pass, and in the order the atmospheric changes had been forecast.

In all, we had just twenty minutes of blind flying in

THE TAKE OFF

The great tri-motored Fokker monoplane, "Southern Cross," taking off from Oakland, California, on the first leg of its flight to the Antipodes, a twenty-four hundred mile all-water hop to Honolulu.

LANDING AT HONOLULU

The "Southern Cross" taxi-ing across Wheeler Field, Honolulu, completing the first leg of the flight.

the cloud belt, and we had come down to make better speed. Scaling these pinnacles of cloud that often crusted the sea, burned up gasoline at a higher rate than the steady flying near the water. So right through, it was our aim to fly as low as was consistent with perfect safety.

At 2.30 P.M. the Paulin Altimeter showed that we were 1,210 feet above the water, which was now an unbroken mirror of deep blue. At 3 P.M. Lyon again altered the local time of the ship, and announced our position as 35° north, 131° west.

When the clouds blew away a little later, we began to watch for possible drift of the ship. There were no foam flakes to help us in this regard, and the flares which we flung out were of no special value in the daylight hours. We peered intently at the ocean in relays, but we could not detect any drift. If we were sweeping sideways to any extent it was not apparent to the naked eye. An hour and a half passed in this way. The conditions were all that the most fastidious flying men could desire, but the monotony was beginning to oppress us more than it did before noon. A plain of blue below us, a vault of blue above, and the engines baying without end. Such was our life. One longed for a walk and languished for a cigarette.

Seven and a half hours out the monotony was certainly broken, but not in the most pleasant of ways.

How much gasoline slopped and gurgled in the wing tanks above us, and in the other tanks below us? This was the question that kept bobbing up in our minds endlessly. The amount in the wing tanks worried us most. Were our estimates of consumption correct? Did they err on the side of generosity, or was more gas eaten up by the motors than we had believed? So we turned the problem over in our minds as the "Southern Cross" rushed on with a steady roar along the gleaming lane painted on the sea by the sun. Mental arithmetic by both of us brought us finally to the conclusion that if our estimates of what was left in the wing tanks was accurate we did not have enough to enable us to make Honolulu. Admittedly they were lugubrious reflections, yet it was not possible altogether to be entirely free from them. The drain when we climbed among cliffs of cloud was always more severe, and subconsciously almost, one began to wonder and ponder on the extent of the tank supply. After a good deal of this pondering, Kingsford-Smith wrote down an estimate that 400 gallons had been used in six and a half hours' flying. Ulm was not in agreement on the point. He considered that only 290 gallons had been used, and felt confident that there was much more gasoline in the side wing tanks than Kingsford-Smith believed.

After we had exchanged a few more penciled notes on the point, we determined to test the position.

At 4.50 P.M. we decided to run on the supply from the outboard wing tanks till it gave out, and with the motor pump we pumped gas from the main tank to the center wing tank. It was patent to us that when these outboard wing tanks yielded up the last of the gasoline that they held, we would know definitely what petrol was at our disposal. So we let the problem rest.

Bringing our minds back from gasoline to progress, it occurred to us with some degree of suddenness that we had been flying for eight hours over an ocean that was quite empty. We had not sighted a ship, yet the newspapers in San Francisco had printed maps showing quite a fleet of steamers that were hugging our course between the Golden Gate and the Hawaiian Islands. Visibility was perfect, yet not a single smudge of smoke showed on the whole sweep of the horizon.

At 5.50 P.M. Lyon sent through a note to us. It told that on a snap sight that he had just secured, he had found that we were southwest of our dead reckoning position. When he plotted our position which he passed to us in his twenty-second note it read "Latitude 33 degrees north, Longitude 135 degrees west."

From time to time, Warner sent out our actual position to the world in the course of our continuous chat about the conditions that we were meeting. Lyon told us we were 700 miles from Oakland, and had 1,391 nautical miles to go to Wheeler Field. It was then 6 o'clock.

In a flare of fire the sun sank quickly on the starboard bow. For an hour we flew against a background of beauty greater than the painting of the best masters of seascapes and cloudscapes. The sun slid down in a blaze of glory glowing like a fiery forge in the heavens. Its rays turned a great bank of cloud into a dream city of white battlements hanging on the horizon. We climbed again from 1,200 to 4,000 feet at the approach of darkness. This was a safety measure that we employed always. In the dark we flew high, as to sweep along low over the ocean at night was not wise if a patch of blind flying was encountered. It was 8 P.M. as we flattened out between 3,800 and 4,000 feet. Six minutes later the outboard wing tanks' gasoline cut out. This was to be the barometer of the gas position, and the indications were not so unfavorable as they seemed three hours earlier.

Darkness muffled us, and the stars popping out in showers, brought joy to the navigating heart of Harry Lyon. Behind us a pale radiance illumined the sea, and we began to fly along a silver path painted by the moon. Her lamp was welcome after the dead blackness that followed the sunset. We will not soon forget that wonderful sunset. Not for years had we seen anything that approached it for beauty.

At 9.15 P.M. we left the clouds behind, and swept on over the glittering ocean in a night that was now sown with stars. Our altitude was 3,750 feet, and our speed 70 knots. The motors that had never once coughed or even, so to speak, cleared their throats, were throttled down to 1,625 revolutions.

Behind us trailed the livid bluish flame from the exhaust pipes. At times it flared from blue to yellow, and even red. It was our stern light in the three nights that we were out over the ocean. Not that we needed a stern light, because the air traffic out there was particularly sparse, yet the blaze of the exhausts helped to relieve the immense loneliness and monotony of the onward sweep between sea and sky. Hour after hour it flashed out over the ocean, a pleasing reminder that the three great motors were doing their duty nobly and well. In our messages to the world we told of this flaming of the exhaust. We have heard since that it was one of the most intriguing pieces of information that we gave out. It caught the imagination—this picture of a trail of flame spitting from the big blue monoplane as it tore its way over thousands of miles of ocean.

At 10 P.M. we decided to check our drift. Lyon flung out water light flares, which he used with the drift meter. They blazed up well, and kept in sight on the surface of the sea for fully twenty minutes. They proved to be useful and effective at night, but not so in daytime. At their first use that night, they showed a very slight drift to the southward. We were holding to our course well.

The stars dwindled, and after another monotonous hour, at 11.36 P.M., we rushed into heavy clouds at 4,000 feet. Then rain smote us for the first time on the flight, and we ran into our second spell of blind flying. For about fifteen minutes we had many bumps and jolts, and the rain lashed the plane. We climbed to 4,800 feet slashing through the cloud reservoir that had poured the rain on us, and above, the stars winked and the conditions were quite genial.

Lyon sent through a message that the Bubble Attachment in the Sextant was out of action. It was then midnight, and our altitude was 5,400 feet, and our speed 67 knots. We estimated that we still had 570 gallons of gas in the tanks; the stars and moon were keeping us company, and in spite of lurking cloud banks ahead, we all felt in excellent humor.

Up to this the sunset, the moon, the fantastic cloud shapes, had done their best to break for us the crushing monotony of that onward rush over ocean and cloud. But at 1.50 A.M. we were rewarded by a new diversion. On the port bow we sighted tiny lights that picked out the black blur of a steamer. Ulm flew the plane towards her, while Kingsford-Smith signaled the ship with our searchlight. This was 6,000 feet beam, and was fitted with a Morse Key for signaling. The vessel signaled back to us with a very bright light. A few minutes later we returned to our Earth Inductor Compass course in a clear sky with no clouds. The moon shone, a few stars still twinkled, and everything was as comfortable as could be.

At 2.17 A.M. Lyon passed through a note saying that Warner had spoken to the S.S. "Manoa" on the radio, and that we should soon sight her. We were then 4,600 feet altitude, and were ambling along at 65 knots. We had a further cause for satisfaction at the excellent work of our searchlight on its first try-out.

We had covered, at 2 A.M., 1,576 statute miles in seventeen hours at a ground speed of 92.70 miles an hour. It was 2.33 when, far below, the lights of the "Manoa" glowed like minute points of fire. Ulm again flew the plane in a circle over the steamer, and Kingsford-Smith signaled with the searchlight.

Here were two first-class diversions to dispel the monotony!

Two steamers within an hour! The ocean, black and forbidding, lit fitfully by a pale moon, lost much of its loneliness. We felt exhilaration at the thought that there were other people roaming about the Pacific besides ourselves. All we saw, of course, were lights and a black blur on the steely surface of the sea. But it was enough. We had company, even though it was far off.

Warner was not idle either, and brought the radio into play to ask our position. At 2.45 A.M. the black bulk of the "Manoa" dropped down into the murky void far astern. Once more we were alone.

We again returned to the Earth Inductor Compass course, and at 6,000 feet altitude at 3.37 A.M. we rushed into another rain squall. Just before this we had throttled back the motors to less than 1,600 revolutions, but when the rain hit us, we opened them up to 1,700 revolutions a minute, and climbed up well above the squall. At 4.45 A.M. we were bowling along at 73 knots at an altitude of 6,000 feet above clouds and in good weather.

CHAPTER VIII

A STUDY IN PSYCHOLOGY; PALSHIP OF MOTORS; THAT MAGIC SHIP WAS A TONIC; OUR GHOST PLANE ATTENDS US; CLOUD POETRY.

THE psychology of monotony!

We began to become saturated with every known phase of it. In the early hours of the first hop we had ample mental occupation. There was that insistent question racing through the corridors of the mind "Is everything all right!" It hammers at the brain of every man who sets out on a long flight in a plane. It cannot quite be termed anxiety. Rather is it a blending of wonder and the sense of responsibility. Every nut and wire may look solid, and may be immovable as a cliff, when a machine is at rest in an aerodrome. But one never quite knows what disturbing effects the terrific vibration of the engines may have. In our case, of course, vibration was even a bigger factor than usual. So it was only natural that as we swept out farther and farther over the Pacific we should revert now and then to this question "Is everything right?" Our precautions to have everything right were precise to the point of meticulousness. Yet the query more than once fluttered through our minds. After the first couple of hours, however, that sense of responsibility that had kept emphasizing itself, lost a good deal of its emphasis. We finally set our minds at peace in the firm conviction that every part of the machine was in its normal state, and ready to play its part in the long hours of strain that lay ahead of it.

It is interesting to seek to recall the changes in the mental processes that take place when you are far out over the cheerless ridges of hundreds of miles of ocean. The airman is apt to treat as commonplace many of the sights from the cockpit of a speeding plane that the man in the street regards with intrigued wonder.

In our case, with our immense responsibility, elation at the excellent take off with a heavy load was followed by that feeling of just a little tense wonder at the condition and the behavior of everything about the ship.

Then many hours later after the first afternoon in the air, the approach of dusk had brought the mind to the question of gasoline supply. It was as inevitable as that sunset whose splendor had inspired us. You cannot help thinking of that spirit splashing there in the darkness of the tanks to every lurch of the plane. It is the life of the plane—the life-blood in quite the most emphatic sense of the term. How were those three baying engines drinking it up? Again and again you wondered. A riot of mathematics fluttered in the brain with the tendency uppermost to think in a radical rather than a conservative way, when estimating the consumption. Subconsciously you took the extreme view, and were prepared to exult should you prove to be wrong. Estimates of gasoline when you are eight or nine good hours from the nearest land is the one conjecture that a man does not object to having disproved. The wider the margin of his error, the more he exults. Aviators are human.

So it was that when the cloud peaks ranged themselves before us in the evening of that first day out, we secretly gloomed. Every climb round those great gray buttes meant that the thirst of the three engines became as keen—as insatiable—as that of a man lost in a desert under a scorching sun.

In our mood with the sense that that spirit was the balance between failure and triumph, we perhaps magnified that thirst of the motors as they went mountaineering among the clouds. It was but natural. You reflected on that spirit in the tanks like a miser. You begrudged the vanishing gallons. And so, mentally, we ran a gamut between black pessimism and a wild exhilaration, till the notable moment of the first hop when the gasoline in the outboard wing tank was no more. Here was a definite milestone in our gas supply. Here was a circumscribing of our field of speculation and arithmetic. It was an incident as full of portent as a clock that strikes the hours and marks the last milestones in the life of a condemned man. Not that we felt altogether like doomed men. Kingsford-Smith's estimate of the drain, radical as it was—influenced by the mood we have described—had been proved to be comfortably incorrect.

In fact, we felt more like reprieved men who had passed through a shadow that had lifted at a most appropriate moment. Yet the outboard wing tanks were empty. That was something almost brutally tangible. We were sixteen hours good flying from the Hawaiian Islands. That, too, was another equally vital fact. Certainly these gasoline speculations had begun while there was still a long distance to go. We were anticipating a position that was not likely to develop for many hours. Yet it was a definite phase in what might be called the psychology of the Pacific Flight.

The next mental change was the oppression of monotony. Its weight grew steadily with the passing of the hours as we rushed through the night. In the cockpit we sat on rather deep wicker chairs placed side by side. But the roar of the motors assailed the ears with the pound, it seemed, of sledge hammers. It was not the least use to try to shout a message across even the foot, or foot and a half, space that separated us. We might just as well have been half a mile apart. We could nudge each other to look at the sinking sun or the rising moon, or the position of stars. That was the most sociable we could be off paper. But as the wicker chairs were deep, we could stretch our legs and lean back for the kind of fitful doze one has on a winter's night on a train without a sleeping berth. It was only a mockery of even dozing. Try to seek repose in a garage filled with cars that all have their engines running. Look for sleep at the edge of a quarry where men are blasting rock with gelignite. You would find as much real rest in either of these situations as we found by lolling back in our wicker chairs. Lyon and Warner could huddle themselves on the floor of the navigating cabin, but the baying of the motors was only slightly less strident on their ears than the ceaseless pounding that assailed ours in the cockpit. And there were just as few moments when they could even attempt the travesty of rest as there were for us.

And so through that first night the monotony seemed to bow us down like the Old Man of the Sea that perched on the shoulders of Sinbad. Crushing monotony and lack of sleep did indeed constitute an equally relentless old man of the Pacific for us. After midnight his weight grew and grew. There came those early hours when the faculties and the body are at their lowest ebb, when vitality leaves you, and the brain shirks its duty.

A keen wind whipping across the top of the shields in front of us froze our chests, and the drumming of the motors at our ears dulled the senses now and then almost to the point of dazing. That thunder tore at the nerves. It helped to build a picture of the flight of the "Southern Cross" that was quite different from that which the layman conjured up. He could, and probably did, accurately visualize the big blue monoplane speeding over the vast sweep of ocean. But what he probably did not appreciate fully was that it was not a silent swift gliding of a plane over the sea track lit up by the moon. It was a progress of tumult accompanied every mile by that deep-throated roar of the motors that often battered at our heads to such an extent that we wished we were miles from an airplane engine, instead of being huddled under three of them.

Eventually we became almost deaf so that we did not hear the roar, but suffered quite the same nerve wear and tear from its terrific concussion. Yet had one of those engines coughed or spluttered, we would have been brought back with a jolt from that kind of coma that the concussion had produced. With our nerves keyed up as they were, we would have picked up the slightest tremulous note in that deep baying of the motors. There came a period too in the mental part of the conquest of the Pacific when, after allaying our alarms about the gasoline supply, our minds swung back to those racing engines.

Would they keep going in the same flawless way for more than 27 hours? Would one or the other of them become capricious? Would any of them let us down?

In this way we pondered. We began to look on those motors as being good pals, pals that would not let down one another if it could possibly be helped. When a man sits for hours communing with the stars and moon and clouds, he is prone to invest the motors, the vital part of the ship, with a living personality. He is, and we were, inclined to admire the sportsmanship of those motors, their die-hard qualities and the wonderful way in which they stuck to their long and arduous job.

If we began to reflect unduly on the fact that one of the motors might show a little unsteadiness, it became a kind of obsession. More than once when we were straining intently in this way for a possible flutter, we began by the very mental intentness to hear an unsteady note that really did not exist. Lyon and Warner, possibly thinking along the same lines, sent through an inquiry or two about the motors. They, too, apparently heard the phantom flutter as we heard it, or convinced ourselves that we heard it. It was a case of actual speculation being the father to the thought, or to the supposition.

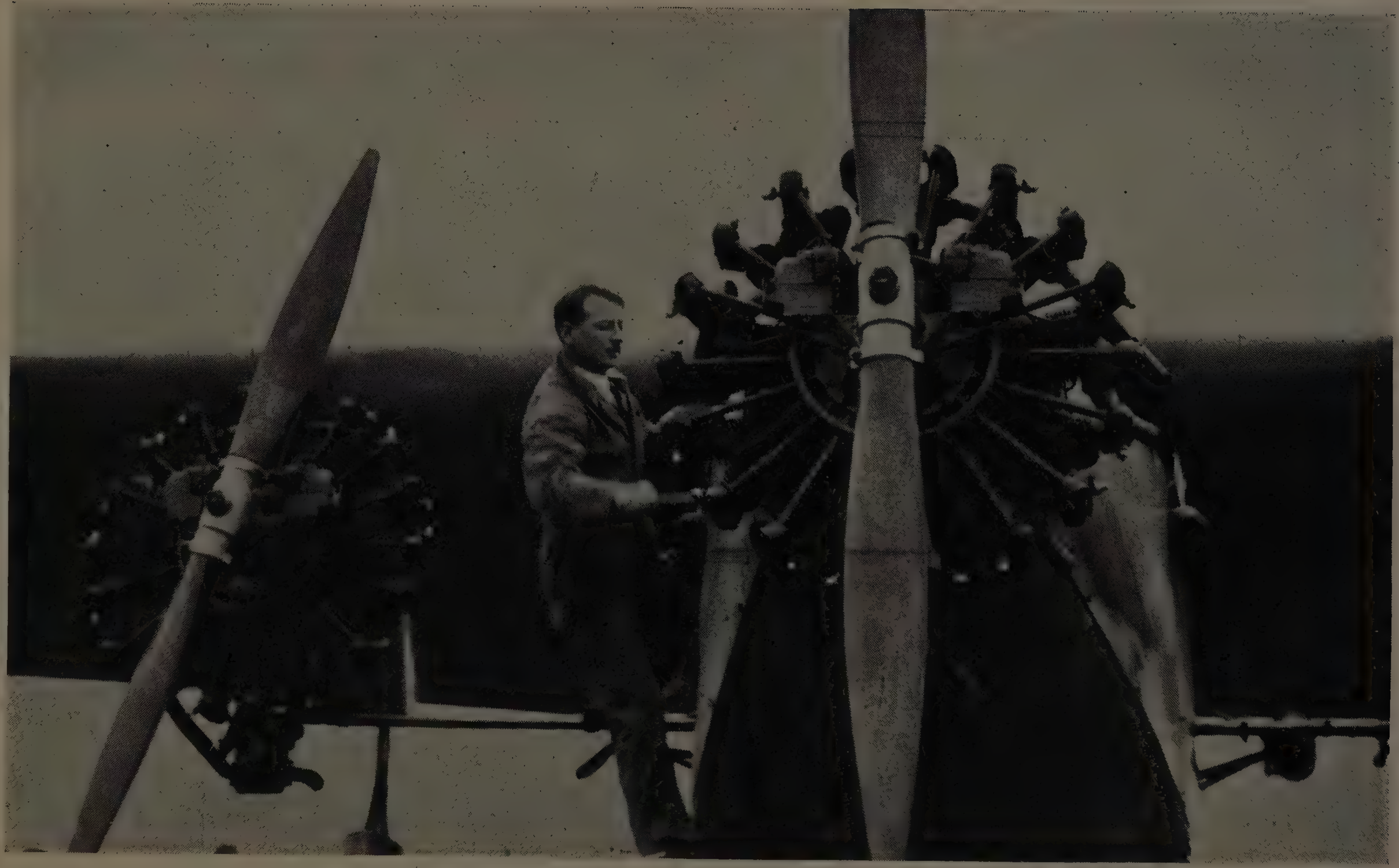
So it was that our only dreams in those periods of fitful dozing had to do with a misbehaving motor or perhaps the eating up of gasoline like a lake in a desert shrinking to vanishing point in a coppery sun. And such dreams were really a base libel on those engines that never for a second shirked their big job.

It was along these lines broadly then that our mental reactions ran in those dark and dismal hours before we sighted the winking lights of that steamer. But what an event was the looming up of that steamer! It was epochal. Most people realize fully on a sea journey the strange thrill that runs through passengers when a steamer slips into sight across the horizon. But to us the thrill was infinitely greater.

Subconsciously the immense loneliness that spread over the ocean heightened by the moon and its lonely path across the water enveloped us. Our world was a vast disc of black water, calm, but forbidding, particularly in the shadows away from the moonpath. It induced a state of gloom that was added to the

HONOLULU IS CURIOUS

The island turned out in force to greet the "Southern Cross," a strong attachment of American troops aiding the flyers and protecting the plane from souvenir hunters.



THE RADIO MAN TURNS MECHANIC

Jim Warner steps out of his rôle as radio technician to start the center motor of the "Southern Cross."

worry of the motors' roar. But there was swift relief when, trailing the cloud fringes behind us, we burst out once more into clear air almost above the dim bulk of the steamer. Here were people out there on the same inhospitable sweep of sea as we were crossing. We had company. At 2.30 A.M., of course, almost every one on that steamer but the watch would have been in their bunks. But we never reflected on that point.

What did it matter if a couple of hundred sleeping people were gliding across the Pacific—they were society for us all the same, sleeping or waking. We were in that mood when even a lamp winking at the touch of a human hand far away down there held for us the value of a long chat with an old friend. The big light with which they signaled us had for us the charm of an evening among good fellows in a club.

We wanted companionship. Sixteen hours had given us surfeit of communing with nature, sublime as it had been. And a cigarette, could we have had one, would have been the summit of earthly felicity. We were in the mood when we might have spurned diamonds for a packet of cigarettes. More than once that song about a cigarette that Gladys Moncrieff used to sing stole into our brains.

After the "Manoa" had been swallowed up by darkness and distance, we were once more left to our own reflections. Mentally, the next reaction was speculation when it was likely to be dawn. In night flying over an ocean there comes that longing for dawn that grows with every hour of darkness. It came to us, that hunger for dawn, that longing for our release from the thraldom of the dark. Because darkness is a thraldom when you are pinned irrevocably on a wicker chair in the cockpit. We lived hours in a tiny restricted world lit up by the glow of the light on the instrument board. Above us for a time was a pale moon, but when it slid down there came that darkness before the dawn, a real blackness of the Biblical kind that could almost be felt. In the navigating cabin, Lyon, in his comparatively few moments of leisure, played patience in the glow of an electric lamp on the little table. But out in the cockpit the cold wind chopping and puffing across the front shields numbed our chests, and petrified our faces, or, at least, those parts of them that were exposed under our flying helmets.

As the night wore on we drifted into that species of stupor that comes from continued wakefulness. It is one thing to remain up all night on solid earth, but it is another and a vastly different proposition to remain awake before the instrument board of a big plane out over the ocean. A dozen influences were associated in making you more fatigued than you become on the land. There was the continuous keen ocean wind whipping your face and shoulders. There was the endless hammering of the thunder from the engines at your head. There was the taut, tense listening for a faltering note in the song of those motors, and there was the physical labor at the controls, especially in those patches where the ship lurched and bumped and dipped. All these things made you fagged, in fact, too tired to sleep. You just sat there with that painful smarting of eyes that have had no rest intensified by the bite in the air. A numbness crept into our frames, and we had to whip up our brains to make them work at all.

To the blasé air pilot, a cloud is just that and little more. It is either a clinging gray bank of murk that imposes on him the rigors of blind flying, or it is an inoffensive cumulus pack over which he can soar. When he considers how climbing over cloud ridges drains his gasoline, he is not inclined to become poetical on the subject of clouds. As this book is a permanent record of what we saw and did and felt, it is permissible for us to become a little descriptive when we touch on the amazing cloud masses that met us some 1,650 miles out in the Pacific.

In the light of the moon, we, of course, had our "ghost" plane. This, too, is a phase of flying which the average airman looks on as being quite a commonplace. But to the layman, the ghost plane is intriguing. What is a ghost plane? It sounds eerie, and to the uninitiated it probably is a little uncanny. But it is necessary to rid the minds of any ideas of a phantom sort of a Flying Dutchman when reflecting on the ghost plane. After 4 o'clock on that morning, when we had been nineteen hours in the air, a phantom "Southern Cross" attended the actual "Southern Cross" whenever we raced over the cloud banks.

Yet the "phantom" plane out there winging its lonely way up and over the cloud precipices, plunging into the cloud ravines and gliding across the cloud pinnacles was merely the dark shadow cast by the monoplane, when the moon was in a favorable position to etch that shadow on the cloud formations.

It was at 6,000 feet between 4 and 5 o'clock in the morning that our "ghost" plane did an immense amount of this mountaineering over the cloud ranges. Here was the most amazing cloud picture that we met on the flight. We gazed down into grim gray cloud valleys where the massive cloud cliffs glittered eerily under the moon. White cloud banks stood out boldly as the ramparts of a giant Arctic berg. They broke into deep canyons; they hunched into mighty peaks and fell away into bewildering white foothills and plains. We were as blasé as the average flying man about clouds, but this picture was so arresting that we were prompted to make a special entry in the Log Book, which read: "Moon on clouds beautiful effect. Breaks in clouds look like rivers and canyons."

And they did look like that. Down in those tortuous ravines, moonlight seemed to trickle. But the cliffs crumpled; abysses closed; canyons were crushed; the rivers were lost, and a new cloud topography arose with every mile.

There was no world. We were sailing lazily on the Milky Way, it seemed. And there, on the dissolving cliffs and buttes of cloud danced that black "ghost" plane of ours. It leapt from cloud to cloud as the monoplane drove steadily forward at 73 knots. We were in this dead dream world an hour. The air was cold, and we could no longer see the ocean. Gradually round 5.50 A.M. dawn began to break. The fantastic hills and valleys of cloud crumbled away to a dreary drifting smoke. The moon had set. Up where we swept through the air, the setting of the moon or the sun took on a special glamour that is not known by the landsman. He sees the sun set along a horizon crusted with buildings and hills, but we looked down at the sun and moon sliding under the rim of the sea. In the cockpit of the "Southern

Cross" was indeed a dress circle seat from which to gaze on sunsets of unexampled splendor. With the moon it was the same on this crisp morning. There was no topography to mar our view, only the great wide disc of darkened water.

And so we sped on!

CHAPTER IX

DAWN—WAITING FOR LAND. FALSE ALARMS. AMONG THE ISLES OF MIST. MAUNA KEA SIGHTED. WE BURST ON HONOLULU. LANDING AT WHEELER FIELD. OUR GREAT WELCOME.

WE opened our second day of non-stop flying literally "sitting on top of the world." We saluted the new day from an altitude of 7,500 feet. It was with a tingle of exhilaration that we saw the light again, as the hours of darkness had been melancholy hours. With the spread of dawn, we got back into a happier frame of mind. Fatigue was relieved to a small extent, or seemed to be with the coming of the light. Yet we were very weary lads when the sun began to set the horizon afire. The engines were still playing that Wagnerian chorus beside our heads with the same perfection as they had done during the hours of the night.

Those motors played the game by us if ever airplane motors did. Not a cough, not a sigh, had broken their perfect harmony. When Lyon got his bearings we discovered that we were 375 nautical miles from Honolulu and 330 miles from the nearest land. It was then 6.33 A.M.

Now the mental processes were entirely cheerful. The speculation over gasoline supply, the cocked ear for an engine cough were now history. Gradually as the "Southern Cross" swept forward, we felt, we think pardonably, a growing sense of triumph and elation. We were nearing our goal, or rather the first of our three goals. Warner and Lyon were more chirpy. The coming of the light had affected them in the same way as it influenced us. Neater wit marked some of the earliest penciled messages that we exchanged, even though the tone of the humor was not altogether of the drawing-room type. Words were neither wasted nor minced in those epigrammatic chats on paper.

As the sun began to light up the disc of sea, we glided down from 7,500 feet to 1,700 feet. This carried us below fairly light clouds that were drifting before a mild breeze. As we got lower, the icy air that had petrified our faces and chilled our chests in the upper levels, gave place to a warmer, more comfortable atmosphere. We were wearing our flying overalls that were lined with rabbit skin, but still we were mighty glad to reach more genial air, as our hands were numb. For twenty-seven minutes we glided down through the feathery clouds at speeds of

80, 86 and 94 knots a little before 7 A.M. We got below the cloud curtain, and then raced ahead of the rising sun at 70 knots. It was a rosy benevolent dawn, and once again the elements had smiled on us. Down at 1,250 feet, to which we descended, the air was bracing, but not cold. At 7.35 A.M. we were 323 miles from Wheeler Field.

We were just 24 hours from Oakland when we began to realize that there are other mirages besides those in deserts. It was 8.56 A.M. when Ulm sighted what he took to be land on the port bow. Clouds seemed to sweep so steeply down to the very surface of the ocean, that he felt sure that there was a cliff there on which the vapor had piled up. In fact, we shook hands on the strength of it. We still had enough fuel to carry us for four hours longer, and we believed that we were getting among the Hawaiian Islands. But we were wrong.

That dark gray cliff was not what it seemed. It was what might well have been called cloud mirage. There was certainly no cliff at the foot of that gray-white peak, as we proved as we swept forward.

From this point all hands began to concentrate on a breathless search for land. Not that there was any vital urgency that we should get to land at the earliest moment, because our gasoline supply had not dwindled to that extent. It was simply to live that great moment of having been the first to pick up the land after that long and wearying night, a night of exquisite monotony.

Ahead of us tumbled a ragged mass of clouds split up in a way that more than once made us believe that there were gray-brown islands to starboard and to port. But they were not islands. Nothing down there would remain solid. Our supposed islands either tumbled to nothing or were blown away bodily. They were indeed castles in the air. Yet the feeling grew and grew, in spite of these unkind deceptions, that the end of the first hop was near. In fact, we told the world so on the radio, and we discovered later that a reference to the deception of cloud had led some people to believe that we were lost. We were never lost. We did temporarily, in fact, very temporarily, lose our bearings early that morning. It led to some confused radio activity, and at Honolulu they became just a little anxious.

Once we could have sworn that a cloud formation was a cliff that flung massive blue shadows on the drifting film of vapor around it. At its foot were three dark brown bulges that looked like rocks. We were fairly confident that we were above the rock-girt coast somewhere about Hawaii. We passed in a plan of the supposed rocks to Harry Lyon, but those dark brown cloud rocks dissolved in smoke, and we were still flying over a steel-blue sea at 9.52 A.M., when Kingsford-Smith thought we had the island of Molokai on our port bow. But it was not Molokai. It was another of those islands of cloud that seemed to be drifting on the surface of the sea like great gray bergs. There was now no monotony. We all got a little excited trying to pick something solid that stood out in the tumbling cloud banks. We nudged each other at least a dozen times to look at some dark shadow that appeared to be "the real thing." Always, however, the shadow drifted off, and we seemed to be in an endless region of isles of mist.

Another hour of false alarms about land and of steady flying through this jungle of deceiving cloud masses followed before we did catch our first real glimpse of the Hawaiian Group.

It was 10.52 A.M. when it happened. Kingsford-Smith was at the controls. We were looking for solids in the cloud drifts, and were being deceived time and again. We were now continually jabbing each other in the ribs and pointing down to a possible solid. But the possible solids proved negative; till far away on the port bow a brown bulge suddenly emerged—a dome-like island that rose from a vast ocean of vapor. It was massive, but when we first sighted it, it was far to port. Unlike the earlier deceptions, this dark pinnacle stayed fixed, and we picked it as being the peak of Mauna Kea.

"How high is that lump of land?" asked Harry Lyon on a penciled note. We wrote back "12,000 feet."

It was Mauna Kea—the snow-capped extinct volcano. At least we had our guide to the Islands. We had been 26 hours in the air. The peak loomed eerily out of the mist. We could see nothing else of Hawaii but this brown dome with snow at its summit. A layer of cloud overhung the island of Oahu, and we glided down to get underneath the curtain. We had won our way through on the first leg of the journey. Of that we now were confident. Every one was as chirpy as a squirrel. A third of the job we had set ourselves to do had been done. We shook hands this time with a little extra fervor. It was justified.

There, at 11.28 A.M., was the tumbled mass of the Island of Maui down on the port beam. Almost at the same moment Molokai swam into view on the port bow. We shook off the fog belt that shrouded the islands all but the great Mauna Kea. Below us Molokai drifted green and purple and gleaming in the sunlight in a sea of deep blue. It was good to see land. Subconsciously we voyaged back over the long 2,000 miles of dreary ocean trail that we had covered with a feeling of exultation that at least that same sweep of cheerless sea had been put astern.

We had the bold promontory of Diamond Head to guide us in over Wheeler Field.

Bells rang wildly, whistles shrieked, and thousands stood in the streets of Honolulu as the "Southern Cross" passed over the city. But we heard nothing but the thunder of those motors. The city glared white and vivid in the noonday sun.

We swung in over Wheeler Field, which is twenty-two miles from Honolulu, and landed at 12.17 P.M. Welcoming planes met us and escorted us to the field. We had covered the first part of our flight, 2,408 miles, in 27 hours 25 minutes. About 130 gallons of gasoline still remained in the tanks as the "Southern Cross" taxied up to the welcoming platform. A great crowd gave us a most enthusiastic reception. We were all deafened and dazed by those motors when we stepped from the plane, and were really languishing for a cigarette. After that, our main needs were some real food and a decent sleep.

We were greeted by Governor Farringdon, Colonel Smoote, of the National Guard, Major Miller, Commanding Officer at Wheeler Field. Captain Lowell Smith, the first round-the-world flier, Art Goebel, winner of the Dole Race, and Martin Jensen, who flew second, were there to shake us by the hand.

Thirty seconds after arriving we were bailed up by the most formidable battery of cameras we have ever seen. In accordance with Hawaiian custom, too, people decorated us with leis. We were motored to Honolulu, and taken to the Royal Hawaiian Hotel, where the Manager (Mr. Cost) insisted that we should be his guests during our stay.

Before we went to bed to sleep the sleep of the thoroughly dead-beaten, we arranged with Major Miller and Captain Lowell Smith to have Army mechanicians check over our motors. We decided that on the following morning we would drain the balance of the gasoline in the tanks. This was to help us to check our fuel consumption. It worked out at 35¼ gallons an hour over the first hop.

For an additional safeguard on the hop from Honolulu to Suva, we asked for facts about the possibility of landing in one of the Islands of the Phœnix Group, if we were obliged to do so. In this we had a piece of good fortune in meeting the Curator of the Bishop Museum. He had toured the Islands, and was able to give us very accurate information on the point. He handed to us charts and photographs which showed that it was quite possible to make a safe landing at Canton Island and at Enderbury Island in the Phœnix Group.

Refreshed by our sleep, we went early next morning to Wheeler Field, and drained the gas from the tanks. We had arranged earlier that a supply of gas should be waiting for us at Barking Sands. We did not wish to fly over and land with our full load so we took only 700 gallons on at Wheeler Field. We were very grateful for the help given us by the Army and Navy at Honolulu. Without it we could not have kept to our schedule. Lyon spent several hours with Naval officers checking the Sextant, and consulting about the other instruments. Warner had the help of the various radio experts at Wheeler Field.

We left Wheeler Field about 5 P.M., escorted by Major Miller and Captain Lowell Smith, flying an Army Transport Fokker, in which Maitland and Hegenberger made the first flight from Oakland to Honolulu. In this plane were carried eight Army mechanicians.

We arrived at Barking Sands on the Island of Kauai about 6 P.M., and immediately inspected the runway, which we found to be in much better condition than we had expected.

We were the guests of Mr. Lindsay Faye at his home that night.

We were astir at 3 A.M. on June 3rd, and drove fourteen miles to Barking Sands. After a consultation on the previous evening we decided to take 1,300 gallons of gas, and to steer a course for a point 100 miles south on the course from Oahu to Suva. In the early morning it gave promise of being a warm day, so we left off our heavy flying suits with the rabbit skin lining.

Appended are the complete entries made in the Log Book of the "Southern Cross" on the first hop from Oakland to Wheeler Field.

ACTUAL LOG ENTRIES—FIRST LEG

THE FOLLOWING ARE THE COMPLETE LOG BOOK ENTRIES MADE BY ULM DURING THE FLIGHT FROM OAKLAND TO HONOLULU.

31st MAY, 1928

The altitude control on center motor jammed forward and cut out center motor after running about 800 feet. Stopped all motors and restarted.

8.54 A.M. Take off time, P.C.T.

Take off revs., 1,800—all three motors.

Take off speed—76 knots.

We estimate take off distance at 2,500 feet runway.

100 feet in two minutes.

200 feet in three minutes.

400 feet in four minutes.

Speed 80 knots.

500 feet in five minutes.

9.00 A.M. P.C.T. Misty fogs over harbor and wharves and Malola.

1,000 feet in seven minutes.

Climbing at 80 knots.

Revs. still 1,800.

9.01 A.M. Turning over City at 9.01 A.M.

Throttled back to 1,775.

9.02 A.M. Smithy and self shake hands on successful take off.

9.06 A.M. Over Golden Gate, 1,100 feet.

Hoisted Aussie Flag.

9.12 A.M. Wrote first radio message, and just then Lyon passed through note to say we were making beautiful course.

Revs.: Pt., 1,760; Center, 1,775; St., 1,760.
Speed: 77 knots.
Altitude: 1,500 feet.
Oil Pressure: 60—60—62.
Oil Temp.: 45—45—40.

9.15 A.M. Sighted Farallones through fog and haze.

9.22 A.M. Passing over Farallones at 1,900 feet.
This our last sight of land for 24 hours.

9.43 A.M. Warner reports we are north of Radio Beacon, and Lyon explains per note that he set northerly course on account of drift. We advised Lyon to change course and get on T. Zone of beacon.

9.48 A.M. Altitude: 1,600 feet. Speed: 76 knots.
Revs.: 1,685 Pt.; 1,700 Center; 1,680 St.
Oil Temp.: 50—53—45.

9.51 A.M. Warner reports gradually working back on T. Zone.

9.53 A.M. I advised Lyon to keep us on Beacon T. Zone by moving the Earth Inductor Compass Controller.

9.56 A.M. Now dead on T. Zone of Beacon. Smithy and I both chuckle to each other.

We know, now, that our strivings for complete equipment of every kind was worth while. Everything is functioning perfectly.

10.07 A.M. Clouds—light cumulus at 1,600, our height—now climbing slowly above them.

Air speed: 72 knots.

10.10 A.M. Clouds banking up thickly ahead—look max. height of 2,000.

As we pass clouds it is bumpy, and getting fairly cool.

10.12 A.M. Opened up motors to 1,750 to climb above thick clouds ahead.

10.17 A.M. Alt. 2,000, now just above broken clouds. Therefore throttling down again.

Warner passed through radio message received from Wheeler Field telling of alteration of signals on Radio Beacon.

10.20 A.M. Keeping keen look out for steamer "Makiki."

11.00 A.M. Ulm took over controls for half an hour.

11.20 A.M. More clouds ahead. We pass over them in beautiful clear sky at 1,700 feet.
Speed: 77 knots. Revs.: 1,695. Getting monotonous.

11.35 A.M. Ulm again at controls—20 minutes.
Experience does count. Smithy flying perfectly. I waver slightly from one side of course to other.

12 NOON Lyon changes time fifteen minutes.

12.15 P.M. Warner informs us no beacon for some time.
Ground speed to date, 85 statute miles per hour.
Still over banks of low broken clouds.
Starboard oil temperature gauge went "phut" at about 10.45 A.M.

12.15 P.M. P.C.T. Height: 2,000. Speed: 76 knots.
Revs.: 1,675 Pt., 1,695 Cen., 1,675 St.
Oil Pressure: 61—58—63.
Oil Temperature: 47—50—.
Ears getting very cold; my nose also.
We're happy as Hell; cracking "wise cracks" ad lib.

12.54 P.M. Four hours out; but don't believe we're more than 330 to 350 statute miles from San Francisco.
Height: 2,600. Speed: 75 knots.
Revs.: 1,700 Pt., 1,700 Cen., 1,700 St.
Clouds seem unending. These three motors give one great confidence.

12.55 P.M. Received very large bumps as passed over new cloud bank.

1.12 P.M. Ten minutes' blind flying; clouds just seemed to blow right up.
We opened up motors and climbed above them.
Altitude now 2,700 feet.

1.50 P.M. Altitude: 2,900.
Ten minutes' blind flying in clouds.
Revs.: 1,700. Speed: 74 knots. Climbing.

2.15 P.M. No more low clouds ahead. Looks like perfect weather, although slightly hazy ahead. Therefore came down to 1,200 feet; trying to make better speed down here.

2.27 P.M. Revs.: 1,650. Altitude: 1,200. Speed: 74 knots.
Oil Pressure: 61 Pt., 59 Cen., 64 St.
Oil Temperature: 45—45—out.
Paulin Altimeter reads 1,210 feet.

2.33 P.M. Water beautifully blue. Very hazy ahead.
High clouds above us.

3.00 P.M. Cloudy high above. Very hazy ahead.
Lyon alters local time of ship.
Position: 35° 00′ N., 131° 01′ W.

3.10 P.M. P.C.T. Clearing up ahead. Sun out above. Perfectly calm water below. No drift apparent to the eye.

3.15 P.M. Clear horizon. Height: 1,200.
Revs.: 1,650. Speed: 77 knots.
Oil Pressure: 61 Pt., 59 Cen., 64 St.
Oil Temperature: 45—47—out.

4.35 P.M. Revs.: 1,620, 1,650, 1,635.
Altitude: 1,000.
Speed: 74 knots.
Visibility good.
Smithy and I worried re gas consumption. If our estimates of what is left in Wing Tanks is correct, we can't make Honolulu.
Smithy estimates we have used over 400 gallons in 6½ hours. I estimate we have used about 290 gallons. I believe there is more in Side Wing Tanks than Smithy thinks.
Have not sighted vessel since leaving San Francisco.

4.50 P.M. Now running on outboard wing tanks until they quit, and using motor pump to pump from main tank to center wing tank. When these outboard wing tanks quit, will know how much we have left.

Speed: 72 knots. Revs.: 1,610, 1,610, 1,610.
Altitude: 1,250 feet.
Oil Pressure: 60, 59, 64.
Oil Temperature: 45, 48, out.
Port Oil Pressure Gauge covered with oil. Can hardly read. I suppose it will quit soon.

5.50 P.M. Altitude: 1,200. Air speed: 73 knots.
Revs.: 1,610, 1,610, 1,625.
Oil Pressure: 60, 59, 63.
Oil Temperature: 45, 48, out.
Lyon reports that on a snap sight just secured he finds us south-west of our dead reckoning position.
He is now plotting our actual position.

6.07 P.M. 9 hours 13 minutes out. Sun sinking quickly on starboard bow; very hazy ahead.

6.08 P.M. P.C.T. Received note from Lyon, No. 22, as follows: Latitude, 33° N. Longitude, 135° W.

5.08 P.M. (Ship's time.) Distance: 700 nautical miles from Oakland. Miles to go: 1,406 nautical miles.

7.25 P.M. P.C.T. = 6.25. Just received message from Cullen-Ward.

7.42 P.M. P.C.T. Perfectly glorious sunset. Everything lovely.

8.00 P.M. P.C.T. Now climbing again before darkness actually sets in.
Altitude: 3,000.
Revs.: 1,675.
Speed (climbing): 70 knots.
Are approaching a bank of beautiful snowy white low hanging clouds. Sun is just about to set. A perfectly gorgeous view.

8.06 P.M. Outboard wing tanks cut out.

8.16 P.M. Half the sun is below horizon. We have been over clouds since 8.05 P.M.
Altitude now 4,000.

Speed: 70 knots.

8.18 P.M. P.C.T. Sunset—the most beautiful I've seen for years.

9.17 P.M. P.C.T. Left clouds behind.

Altitude: 3,750 feet.

Revs. p.m.: 1,625, 1,625, 1,625.

Oil Pressure, 60, 59, 62.

Oil Temperature: 42, 48, out.

Air speed: 70 knots.

Stars out. Moon coming up from behind.

10.00 P.M. P.C.T. Water light flares for use with Drift Meter are thrown over and show up well.

The exhaust flames, vari-colored, are very pretty.

I observe a very slight drift to the southward.

A few stars out; not too many.

11.36 P.M. P.C.T. Ran into heavy clouds at 4,000. Rain and bumps. Blind flying.

11.52 P.M. P.C.T. 4,800 feet; climbed above rain and clouds. Stars ahead, moon above.

11.58 P.M. Bubble attachment in sextant reported out of action.

12 MIDNT. P.C.T. Altitude: 5,400. Speed: 67 knots (climbing).

Revs.: 1,650, 1,660, 1,610.

Pressure, Oil: 60, 59, 62.

Temperature, Oil: 42, 48, out.

I estimate 570 gallons gas now in tanks.

Heavy cloud bank ahead, but think we'll be above it.

Stars and moon gratefully accepted.

1.50 A.M. P.C.T. Sighted ship on port bow. I flew plane round while Smithy signaled them with searchlight.

1.55 A.M. Returned on to E.I.C. course.

Clear sky, no clouds; good moon; a few stars; everything lovely.

2.17 A.M. Should be over S.S. "Manoa" soon, but low clouds will prevent us seeing her.

2.20 A.M. Altitude, 4,600 feet. Air speed, 65 knots.
Revs. p.m.: 1,560, 1,590, 1,575.
Oil Pressure: 60, 59, 61.
Oil Temperature: 42, 50, out.
Everything O.K. Searchlight works well.

1.50 A.M. 1,576 statute miles made good in 17 hours.
Ground speed: 92.70 statute miles per hour.

2.33 A.M. Sighted steamer on port bow. Smithy signaled with searchlight while I flew "S.C."

2.45 A.M. "Manoa" out of sight.

3.37 A.M. At 6,000 feet ran into another rain squall. Opened up motors to 1,700 and climbed above it.

4.45 A.M. Moon on clouds; beautiful effect. Breaks in clouds look like rivers and canyons.
Altitude: 6,000 feet.
Speed: 73 knots.
Revs.: 1,600.

5.55 A.M. Dawn breaks; moon sets.
We at 7,500 feet.

6.33 A.M. 375 nautical miles from Honolulu.
330 nautical miles from nearest land.

6.43 A.M. Gliding down through clouds.
Now 4,800 feet. Speed: 80 knots.

6.54 A.M. P.C.T. Now at 3,000. Speed: 86 knots. Revs.: 1,575.
Going through some of the lower clouds.

6.57 A.M. 2,600 feet. Speed in glide, 94 knots.
Revs.: 1,575.

7.00 A.M. P.C.T. Below clouds at 1,700 feet.
Speed: 78 knots.
Revs.: 1,530 P., 1,565 Cen., 1,555 St.
Oil Press.: 61, 59, 62.
Oil Temp.: 48, 49, out.
Much warmer down here.

7.36 A.M. P.C.T. Height, 1,250 feet. Speed: 70 knots.
Revs. p.m.: 1,535 Pt.; 1,550 Cen.; 1,525 St.
Oil Press.: 60, 58, 60.
Oil Temperature: 50, 50, out.
323 nautical miles from Wheeler Field.
8.56 A.M. Land sighted on port beam.
Smithy and I shake.
9.17 A.M. All apparently mistaken. Only clouds; no land sighted yet.
9.52 A.M. Think Molokai on port bow.
10.52 A.M. Mauna Kea sighted!
11.06 A.M. Gliding down to get under fog surrounding Oahu.
11.28 A.M. Maui on port beam.
11.29 A.M. Molokai on port bow.
12.17 P.M. LANDED WHEELER FIELD.
Escorted from Oahu by Miller and Lowell Smith.

Part Three: HONOLULU TO SUVA

CHAPTER X

WE BECOME REAL EXPLORERS. THE START FOR SUVA. OVER AN UNFLOWN SEA. WIRELESS WORRY. WE AGAIN LOSE THE RADIO BEACON. A GAS LEAK THAT WASN'T!

WE were certainly "early birds" at Barking Sands. The palms and the beach and the plane looked ghostly in the first grayness of the dawn. We had seen comparatively little of the "pearl of the Pacific"—a confused blur of cheering people, hand shakes, yards of leis and a motor dash along a road fringed by palms and colorful shrubs. That was about the sum total of our impressions. But Kauai was enfolded in darkness when we were whirled in the car towards the beach.

Here we had reached the second great moment of the flight. The first was when we took off at Oakland. But that morning at Barking Sands in the first paleness of dawn as it stole over the ocean we believe was possibly a greater moment to us than when America wished us God-speed.

On our first hop to Wheeler Field we were following an ocean trail that had been blazed before. At

Barking Sands we looked out over a ribbon of surf on to an expanse of ocean that had never been conquered by air, or that never even had had its conquest attempted. Ahead of us every mile was to be aerial exploration. We were indeed on the borders of a new air world. Out over the sea there was the thrill and charm of uncertainty.

What lay in wait for us out there? Would the weather men be confounded?

Were the hurricanes of the South Pacific insuperable barriers to an air voyage? Were the tropic conditions in a new zone from an aviation viewpoint likely to prove an aid or an impediment to our onward sweep?

Would the trade winds favor us in our South-westerly dash? Would the area prove so storm-ridden that we would be forced to land on Canton Island in the Phœnix Group?

Such were a few of the queries that came to the mind. In fact the uncertainty attracted rather than repelled. In any future air mail service between America and Australia here was a section that would have to be covered, and would have to be explored and pioneered. We were going to do that exploring and pioneering. Before us lay 3,138 miles across ocean—the longest ocean hop. There were no precedents to consult. It rested with us to establish the precedent for others to follow later. We were going to do that. Our confidence was increased by the excellent behavior of the "Southern Cross" between Oakland and Wheeler Field, the flawless precision of those motors and the wonderful navigating aid and general inspiration that came from the two-way radio communication which we were able to maintain the whole way.

Why should we have lost one fraction of the faith we reposed in our equipment and organization?

It had responded in the fullest way possible to every demand that had been made upon it on the first 2,000 miles of the long journey. What better could it have given us? Petrol supply and consumption, navigation, instruments, had all dove-tailed into what we chose to regard more as a complete job of work finished than a world-stirring triumph. If the same dove-tailing of these elements in our expedition was as harmonious in the South Pacific it would carry us over the 3,000 mile stretch of ocean, and then we might, with a show of justice, be permitted to employ the word triumph with added force.

At Honolulu there were people who were disposed to shake their heads at our determination to push on. Some of them feared for our safety. But before us lay a schedule of flying. It was a schedule which we were going to do our best to observe.

"Dinner on Saturday night in Sydney." That was the slogan we framed. That was the ambition that we set ourselves. It was then the previous Sunday. Why delay? What purpose would have been served by waiting to start on Monday?

The sweep of ocean would still be there to be crossed just the same. In twenty-four hours we would be three-parts of the way to Suva. Again, just as at Oakland, our anxiety to get a start was not dictated by any spirit of bravado. We realized to the full, just as our critics did, that the second hop was going to be a real man-size job. Of that we had no doubts or illusions. It was a big job, but we pinned our faith to the plane and its equipment. It would be wrong to say that we were absolutely devoid of anxiety. On one point we were a little anxious. Could we lift from Barking Sands with 1,300 gallons of gasoline?

That was the one problem that worried us. We felt that once safely in the air with that great load we were well on the road to success. United States Army Mechanics had looked over the motors, and had found them to be in perfect condition for the long-sustained spell of work ahead of them. The "Southern Cross" had stayed aloft for 50 hours 7 minutes before, and there was no doubt about the ability of the machine to keep in the air long enough to reach Suva, even in unkind weather conditions, and leave a margin that would be reassuring. In the matter of weather, we would, of course, have to take whatever came our way, but we had a stout ship, and felt that it would have to be particularly dirty weather to beat us altogether.

"Dinner in Sydney on Saturday night." That was the axiom to keep in the mind and not mournful speculation about storms. Outweighing all thought of the hardening of odds against us as compared with the first hop, was the thrill, the romance of standing on the threshold of discovery. Here was unflown sea. To us was about to fall the honor of rediscovering Fiji from the air, and of rediscovering even the eastern coast of the Australian continent in the same way.

Here was an achievement that was worth a sporting chance. It was what we set out to do, and what we had planned and plotted for ten months to do. If the odds were six to four against, what of it?

Drake and Magellan and Columbus had not been dismayed by doleful predictions. If they had been influenced in this way, they would have got nowhere in particular. Columbus would have turned back in mid-Atlantic had he listened with a sympathetic ear to the grumblings of his crew.

We were in a better position even than Columbus.

There were no divergent views among our crew. We were solid for that Saturday night dinner in Sydney. The harbor that we had not seen for ten months beckoned, and we were determined to get there unless the elements ranged all their destructive force against us.

Thus Barking Sands, dim and ghostly in the dawn—a place of no especial beauty—will live long in the memories of all the "Southern Cross" crew. We had hardly heard of Barking Sands before Sunday, June 3rd. It was a fairly safe bet that the world outside Hawaii probably had never heard of the beach at all.

A gang of men had cleared a runway of 4,500 feet. Our gasoline lift of 1,300 gallons was a great one. We needed at least a run of 3,500 feet to be certain. The 1,300 gallons promised to give us at least forty-one hours in the air, even when allowance was made for adverse conditions hastening consumption. There was a mugginess in the air that promised a warm day for us out there over the sea. The moon was just fading out as we climbed into those wicker chairs in the cockpit once more.

It was then about 5.12 A.M. We warmed up the motors, and again their perfect rhythm promised well. Ten minutes later the "Southern Cross," over-loaded to an extent that few planes have been on a really long ocean flight, lifted from the runway. We had asked Lowell Smith to stand at the 3,500 mark of the runway so that we might secure an estimate of our capacity in lifting.

We actually got off after a run of 3,400 feet. Behind us we left two trans-Pacific planes on the Barking Sands flying ground—the Fokker of Maitland and Hegenberger, and the "Aloha," which Martin Jensen flew over the ground.

In climbing, the motors reached 1,825 revolutions, which gave us an air speed of 86 knots. We had only climbed 300 feet in six minutes, when the ship rocked heavily in a series of off-shore bumps. There were several tense minutes, and with such a heavy petrol load, it needed great care to ease the jolting effects of these bumps as much as we could. At 5.30 A.M. we were on our Earth Inductor Compass course at 350 feet altitude. As we skimmed low above the sea, we had our last look at the gray-green bulk of the island of Kauai on the port beam, and gliding rapidly astern. On the starboard side the sinking moon flung a glittering track across the ocean's rim. In spite of a desperate rush we had succeeded in keeping to our schedule, and we indulged in the third memorable handshake of the flight.

The other two were over the Golden Gate and when the peak of Mauna Kea swam into view out of the sea of mist that muffled Oahu.

Again came that inevitable thought to both of us "Is everything all right?" Had there been any vital omissions or forgetfulness? On that score we had no need for worry, although it had been a rush to keep to schedule. Everything was quite in order. The three engines boomed out a challenge to the unflown ocean that ranged away before us—a vast plain of gloom and haze lit fitfully by the dying moon. We moved up to 500 feet at a speed of 78 knots, but we returned to 400 at 76 in a few minutes. We decided to remain as low as was wise, so that we might conserve every gallon of gasoline possible.

It was a very long trail ahead of us—a trail clouded a good deal by uncertainty, and we could not afford to take any unnecessary chances with our gasoline. It was the climbing and the haulage of our heavy load aloft that would cause the motors to drink up many a gallon that at some later stage when the weather was not so kind to us, might become as valuable as the nectar of the gods.

Fifteen minutes after we had lifted from Barking Sands, and when Kauai, now just a dim gray blur, was dropping out of sight on the port beam, we sighted drifting masses of cloud far ahead. It looked as if we were to face the same cloud regiments that had blocked our view of the ships along our course from Oakland. From Wheeler Field, United States

Army radio operators flung out a radio beacon to guide us on our course for Suva. It was expected that we would have that helpful radio buzz with us for about 700 miles. At 5.45 we altered our course, swinging the "Southern Cross" a few degrees to port to pick up the beacon signals. A few minutes later we had to modify our plan to fly as low as possible, because Warner sent through a penciled message that he wanted more altitude so that he could let down the long wave aerial. So we opened up the motors to 1,775 revolutions, and climbed at 75 knots to 850 feet. Far on the port beam the sun began to light up the long sea horizon, but the clouds kept sifting up from the southwest. Warner now had the altitude he wanted for his wireless needs, so we flattened out at 850 feet to charge under the cloud banks at 74 knots instead of plunging into them. Clouds now massed into a long roof, but without descending we were able to fly under them.

We did not relish the prospect of flying blind, as the enormous load of the gasoline had to be considered. We had just begun to skim under the light fringes of this long cloud bank when Warner passed through another note. It read: "One generator bad." A short circuit had developed in the "A" Battery charging current.

This was the first check to the exuberance of our spirits. As we left Kauai behind, every one was happy, but the prospect of losing the help of radio was always a little depressing. On the first hop to Wheeler Field it had been a wonderful aid, playing such a big part in our initial success that we had come to regard it as being an integral part of the expedition. It was not cheering to look forward to 35 or more hours over an unflown expanse of ocean completely cut off from the world. There was, of course, a much bigger and more important aspect than the mere sociability of being able to speak to the world and to receive cheering messages from both sides of the Pacific in return.

Radio was our invaluable ally to navigation to follow the beacon, and to speak to ships or shore stations. Particularly was this so on the hop we were now beginning—the most critical phase of the flight. In effect we were, as American observers had graphically put it, "making a long shot at a dot on the map." Never had we greater need of every possible agency that would help our navigation. Harry Lyon's job was no sinecure on this hop. Our feeling of gloom at the misbehavior of the Generator can thus be understood.

Warner set to work to make repairs, and inside ten minutes we were ready to whoop for joy, if the whoops could have been heard above the thunder of the motors. Both Radio Generators were once more working normally. For us the sun had broken through a nimbus cloud. We had found the world and were happy.

At 6 A.M. we raced along an endless corridor of clouds whose light white fringes trailed down ahead of us. Ten minutes later Jim Warner picked up the "A" radio beacon signals. This was mighty cheering. In the words of the old war bulletins "Everything was working according to plan." We were all in the best of spirits then, as the clouds were not giving us much trouble, and we were riding the radio beacon.

At this point came the first shaft of humor of the new flight. Lyon is a born humorist, at home anywhere, and ready to crack a joke about anything. In fact, quite apart from his unquestionable skill as a navigator, he was a ray of sunshine on the trip! Whenever the monotony began to weigh heavily, Lyon could always be relied on to sparkle at his wittiest. Along would come his jokes on that much maltreated notebook. He was irrepressible in fair weather or foul. In the intervals between his sights and his checking of our varying position, which at times were neither many nor frequent, he would pass in a pungent epigram or a pun. Some of his jokes were a little cryptic. Just after we had got on to the

"A" beacon signals he passed through to the cockpit a message that read: "Australia, United States, the 'Southern Cross' and Mrs. Lyon's son, Harry, are saved, as I have found my missing papers." This was quite a mystifying piece of humor to us. We did not know that he had lost any papers, nor did we know to what papers he referred. Harry was a genial soul.

We sped forward at 74 knots in touch with the radio beacon, and at an altitude of 625 feet. The sun now illumined a vast disc of listless oily sea. We lived again in a world of our own, but this time in a new world. Behind us sifted a light ten-miles an hour breeze. Ahead the clouds that had dragged down almost to the water's edge, were lifting, and it seemed to be clearing up in a promising way out on the rim of the ocean. We were making fine progress on 1,750 revolutions, and our estimate of the ground speed was 84 knots.

Our first rough check on our gas consumption at 6.52 A.M. was most encouraging. The wisdom of the policy of flying low was fully vindicated. We were in a much better position from a petrol viewpoint than at the same stage previously—an hour and a half's flying from Oakland. "Avoid climbing as far as possible and save the gas," was to be our slogan, as there was a darned long way to go. These first checks made more pleasant those inevitable speculations about the gas position that creep gradually on the flying man when he is out over the sea. A little later we changed our course considerably to starboard to move on to the "T" zone of the radio beacon. Warner began sending out to pick up the report of the weather that we were likely to meet further down the Pacific. It looked clear ahead, but we wanted the forecast.

At 7 A.M. the clouds had dissolved to a great extent, and the sun was making the long water trail look much more benevolent. It was at this moment when the prospects were most rosy, and the whole party in a most tranquil and jovial frame of mind, that there came a sudden revulsion. In thirty seconds the smiles vanished, and we could no longer see any beauty in the great gleaming lane that the sun was painting for us over the ocean.

It was a slight trickle of liquid that caused the scare!

Ulm saw an ominous drop fall from the wing tank almost in line with the head of Kingsford-Smith, who was at the controls.

It was only an insignificant looking escape of fluid from above. It trickled along the steel of the lower part of the wing, and dropped. But that trickle seemed full of menace for all of us.

Was it gasoline? That was the question that leapt to our minds, and the pencils began to scribble feverish notes on the leaves from the book. Steadily the trickle ran along the steel and fell down somewhere into the cockpit.

If it was gas the possibilities were of the gravest kind. Risk of ignition of leaking gasoline was a contingency upon which one could not reflect with any degree of calmness. Risk of a serious leak in the tanks was an equally disturbing possibility. It was really a case of two evils without there being a lesser one. That is, of course, if it was leaking gasoline!

It was a breathless, and in a sense, dramatic moment as Kingsford-Smith set out to try to determine the nature of that mysterious dripping. Ulm took over the controls. We wanted to talk and discuss the nature of the leak, but the engine thunder, of course, drove us to the notebook.

It was indeed the torture of Tantalus not being able to utter a word about a possibly serious contingency like that one. All we could do was to nudge each other in the ribs, and point in dumb show to the leak. However, all the doleful thoughts were quite without cause. It was a moment of relief and delight when we found that the innocent-looking trickle of liquid was really as guileless as it appeared. It held none of the menace that we had thought it held, hanging there like a sword of Damocles above our heads.

The plain fact was that the trickle and the drips were formed of harmless water that had formed by the condensation of cold gasoline in the pipe. We all breathed again, and rejoiced in the inaccuracy of our suspicions, just as we had exulted when we were proved wrong out before Oahu in our estimates of our dwindling gasoline.

After all, it was not really a major scare. It was only the anticipation of what might have happened if the leak was in the gas tank, that gave us such a tense few moments.

We had just relaxed again after the scare, when Warner sent through a note that stated we were on the "T" zone of the beacon. It was clear that with the engines running with the same harmony as ever, we were making excellent ground speed, possibly up to 86 knots. We had every cause to be satisfied with the position. The wind had chopped round a little to our left flank, but it was still giving us some help.

CHAPTER XI

WE HUG THE SEA TO SAVE FUEL. AGAIN THE RADIO TAKES A REST. STERN TUSSLE WITH RAINSTORMS. BLIND FLYING AND THE CONTEST OF SENSES AND INSTRUMENTS. STARBOARD MOTOR SHIMMIES. RACE WITH THE CLOUDS. WE MEET THE "SOUTHERN CROSS."

WE had much more drinking water on this hop. That was a necessary precaution, because in the last six hours' flying before we landed at Wheeler Field, there was a parching drought aboard the "Southern Cross." We had drunk all the water during the night, and early hours, and did a rigorous thirst after sunrise.

On this occasion we determined that if possible we would not again suffer the pangs of drought. Our food was practically all in the form of sandwiches. Nothing else was so easily handled in the confined space in which we lived. We have never eaten so many sandwiches in our lives, and when we left Kauai we brought with us whole regiments of them, thanks to the kindness of Mr. and Mrs. Faye, our hosts at Kauai. So far as was possible, we planned to defeat thirst and hunger on the long hop.

From 7 A.M. to 8 A.M. we bowled along at a ground speed of 81 knots. Our altitude was still only 500 feet. We were figuratively hugging the sea as long as we could to save that vital gasoline. But it was apparent that our best-laid plans in this respect would very shortly "gang agley."

Visibility was still good, our oil pressures and temperatures were perfect, but far ahead the horizon was blotted out by low drifting clouds. It was growing duller. The sun was obscured by murk. There seemed to be water in the air. Rain apparently was blowing up many miles ahead.

Again we had just breakfasted on sandwiches and coffee, and were feeling in excellent humor, when we were suddenly jolted out of our comfortable frame of mind once more. Warner sent through a note. We had lost the radio beacon. Its signals had faded away at 8.15, and we were only three hours out. We had expected that its friendly buzz would have accompanied us for seven hours.

This, however, was not the worst news.

We had just a little more than an hour's flying without the radio beacon, when Warner reported that our radio equipment was completely out of action. We were then flying towards what looked like a barrier of rain in the far distance. Our altitude was only 550 feet, and our air speed was 77 knots.

Between 8 and 10 o'clock the rosy promise that seemed to have been held out at sunrise had changed for the worse. A stern tussle with rainstorms looked inevitable in an hour or so, and we found ourselves again cut off from the world. The radio beacon had failed us, our own instrument had decided to declare a strike, and for the second time in five hours' flying we found ourselves in that isolated world whose limits were set by the front windshields and the exhaust pipes. And this time it was a more dismal world than the first occasion when we had been isolated from the radio voice of the world. There was no sun awakening a flash and sparkle from the sea. The innocuous cumulus packs had given place to wicked-looking rain clouds that seemed to be charged with all the evaporated waters of the globe.

We missed the chats with the world. With every mile the loss of the radio words became greater. Our sense of loneliness increased. We felt in the miserable position that a man must feel who suddenly has lost the use of his voice. Our radio voice was silent, the radio voices of the two continents were also silent, and there we were plunging into gloom actual and temperamental. The actual gloom came down on us like a damp blanket. The ship was slipping along splendidly at a ground speed of 90 knots, when the wind began to freshen. Its sudden puffs turned to tugs and slaps and punches. Ahead, great dark clouds tumbled in a headlong rush. The wind whipped up from ten to twenty miles an hour. The sun was blotted out. At 11.40 A.M. we plunged into the squall, still voiceless.

Right ahead the nimbus clouds dissolved in a curtain of rain. The fringe of it splashed us before we flew round the main deluge. From that moment began a wild aerial jazzing out of the way of rain. The storms that had been lurking ahead for the previous three hours flung themselves across our path. Like ominous gray curtains that trailed their fringes across the surface of the sea, rainstorms charged at us from every direction, driven before a fresh wind. Ulm swung the ship out of the way of one storm, and Smith steered her clear of a second. But the dark curtains closed in—beset us from every side, and merged into a great belt of swishing water.

It was a cheerless hour. Visibility shrunk from seven or eight miles to one, then to half or less. Just when a dim and dismal path seemed to be opening out before us through these walls of water, the wind chopped round and closed the murky corridor. Kingsford-Smith set the nose of the "Southern Cross" down one of these watery corridors in a dash between the merging squalls. He got through, and we earned a slight respite from the battering by the wind. But it was only a passing lull.

The rainstorms surged in round us again. We were 600 feet up, and as we had been flying for only six and a half hours, our petrol load was still tremendous. To fly low in such atrocious conditions, heavily overloaded, was an experience that did not at all add any to the peace of mind.

To dodge around the fringes of the storm and to climb through the murk were the kind of maneuvers that were going to mop up our gasoline at a disconcerting rate. To fly low overloaded in the face of the savage chopping gusts with visibility shrinking to a few hundred feet was to flirt a little too dangerously with risk. We were indeed on the horns of a dilemma. We were forced to decide on a policy, as we had not the faintest idea how long this battering by the storms might continue. That policy was to climb, to risk a heavier petrol consumption, and hope for the best. So we opened up the motors to 1,775 revolutions, and plowed up through rain and storm and a jolting nasty wind which blew in sudden gusts.

Visibility shrunk at an incredible rate; the rain became thicker, and at 11.50 A.M. we were flying blind and climbing to get out of the deluge. The plane bumped heavily in the tearing gusts, and we got out of it at 1,000 feet, only to be faced with another menacing black curtain of water. Our spell of blind flying through slashing rain was not a long one, but the ship bucked and lurched heavily as the wind seemed to chop in three directions at the same moment. Visibility opened up to about 200 feet again just before noon, when we began to glide down to 600 feet to get under a rainstorm that was massing up ready to burst on us in full fury. Just as suddenly as we had to fight these squalls, we tore through into moderately clear air once more. We were, of course, plugging along at 76 knots all the time.

Noon (12.30 Honolulu time) saw us just through the barrier of squalls. Lyon took a sight with the Sextant to get our latitudinal position. We were then seven hours from Kauai. Kingsford-Smith had flown 4½ hours, and Ulm 2½ hours. There had been a long silence from Jim Warner in the navigating cabin, and it was clear that we were still without our radio voice or ears. Yet we had the utmost faith in the ability of Jim. If the radio equipment could be readjusted, Jim was the man to fix it.

In the thrill of sidestepping, or rather side-sliding, out of the path of storms, we had forgotten the atmospheric conditions. It dawned on us as we emerged from the tumult of rain, that it was oppressively hot in the cockpit. The heavy water-laden air, the passage into a definite tropical zone, and the waves of heat from the motors, caused us to perspire. As we took our coats off, we swept past a cloud bank abeam that was just dissolving into a rainstorm that looked more wicked than those through which we had passed.

At 12.45 (Honolulu time) we had flown 630 miles in just seven hours, at an average ground speed of 90 miles an hour. Lyon, after his observations, then passed through our position as being "Latitude by observation, 12 deg. 47 min.; by dead reckoning, 12 deg. 58 min.; Longitude 163 deg. 13.

Rainstorms came sweeping up at us endlessly, lashing the plane, beating a lively tattoo on the windshield, and making us fly through a murky soaked world that seemed to have no boundaries. Conrad's skipper preferred to plow through a China Sea typhoon rather than run up his coal bill. Like him, we became misers of petrol. We resolved to keep flying at 600 feet, because if we went higher, we would burn more fuel. When we plunged into a heavy rainstorm at 12.50 there was only one bright spot in a most cheerless prospect. The motors were fighting the storms with such stubbornness that our ground speed was maintained in a most satisfactory way. Kingsford-Smith flew seven minutes blind through the new storm. The rain poured in rivulets from our windshield, and though it was high noon, and a tropic noon at that, we tore through a wall of water where visibility ceased to exist.

Already in seven hours we had experienced more blind flying on this stage of our flight than on the 27½ hours between Oakland and Honolulu.

What is blind flying? Most long distance airmen know, but to the average man in the street the term may be rather vague.

If you have ever tried to drive a motor car along a bush road on a pitch black night without a headlight or a rear light, or even a match, you will gain some slight idea of the meaning of blind flying. But even then, with that nightmare experience, you would not have lived through all the thrilling uncertainty of flying a plane in a dim opaque world of nothingness. That is because in a car you could only go forwards or backwards.

In a plane there are any number of movements that have to be regulated. It not only goes forward, but may climb or drop or bank or sidestep, or drift.

How do you know when a plane is banking, when all round you is inky blackness? How can you tell its drift sideways? You can do none of these things without the proper instruments, and without the blindest, the most implicit faith in them. In blind flying when a plane charges through lashing rain in a black void, there is a contest between your senses and your instruments.

Your senses may lead you to believe that the ship is climbing or descending. They may tell you that the plane is banking steeply. And it is possible for the senses to be quite inaccurate.

It seems revolutionary to oppose the dictum of the senses in such a matter as this. Yet in blind flying, if the instruments show that the plane is banking when your senses indicate that it is thrashing its way forward on an even horizontal wing, the instruments are correct, and not your senses. It is not easy to allow the mind to become as elastic as this. The process is in the same category as that which a dentist demands of a patient when he asks him not to sit rigid against the forceps, but to relax. To relax the mind in such a way as to doubt your own senses is no joke. Yet that is what blind flying demands during every minute when visibility is definitely cut out.

Your whole world is reduced to an instrument board illuminated by an electric torch. Over the edge of the windshields of the cockpit there is nothing but blank grayness. At the sides there is nothing but blank grayness. Behind you there is nothing but blank grayness. Unlike the darkened car on the darkened road, however, there is nothing to hit if the altitude is correct.

If the altitude was not carefully adjusted and watched, however, with us there was the ghastly possibility of hitting the surface of the ocean. That was where our altimeter played its important part. It told us constantly how far from the sea we were when we were plunging through that soupy grayness. Without those instruments it would have been impossible to fly blind for an hour without disaster.

At 1.22 P.M., when we came out of our third spell of blind flying, on the new stage of the flight, Warner had good news for us to relieve the gloom that is apt to settle on one in those patches of blank grayness. Both radio transmitters were working normally again. Once more we had our link with the world, and to speak figuratively, we had "come back to life."

A little later we again dashed into heavy cloud banks. We climbed, and once more had to sidestep two savage bursts of rain that came tearing at us. The cloud curtains thickened; the rain lashed us with greater fury, and again we were in that dim opaque world flying blind. The windshields began to leak, and water started to trickle in on us. Then our real personal discomfort commenced. Water splashed into the cockpit and soaked our feet and legs. In less than half an hour we were very damp and a little disgruntled. For an hour we flew low against oblique sheets of stinging rain.

There was one vast difference between this leg of the flight and the trip to Honolulu. That crushing monotony of calm sea and cloud beauty did not linger with us. We were about ten hours out, and there had not been a continuous half hour of monotony. Things seemed to happen in a steady sequence. There was the losing of the radio beacon, the capriciousness of our own radio instrument, the supposed gas leak, the opening lively rounds with the rain-squalls, and the sudden transitions from murk to blind flying. We had plunged on through the driving rain for about another hour, and we were beginning to believe that the rush of incident was about to ease, when there was another scare and a few moments of anxiety. We were just changing over at the controls, working them on an hourly duty roster.

Kingsford-Smith had taken over the controls, when there was a sudden tremulous cough in the starboard engine. It was not a bad spluttering cough, but just sufficient to break that wonderful harmonious chorus that the motors had played for us now over 3,000 miles of ocean.

We thought hard for a few seconds. Then came a note from Lyon to ask about the motor. Our ears were so attuned to the steady thunder of the three motors that in the navigating cabin Lyon and Warner had also instantly detected the unusual highpitched bark of the starboard engine.

What was wrong? We were nearly a thousand miles out over a stretch of ocean that could not possibly have looked more inhospitable or forbidding.

Were the motors going to let us down after the wonderful comradeship they had shown us since we left the Golden Gate? We were secure in the fact that at least all three motors would not—to use the boxing term—"throw up the sponge" at the same moment, or even in the same hour.

It would have been extremely bad luck for one of them to have refused duty, but it would not have been altogether desperate.

Yet that cough sounded menacing. For 3,000 miles across the great sweep of ocean that we had covered, our ears had become sensitized to the slightest irregularity in the beat of those motors. We were constantly on the alert, listening, so to speak, like an Indian with his ear to the ground, with the essential difference that our ears were very far from ground of any kind. Mile after mile one could not dull this tense ear strain for the possible cough or splutter of one of the engines. It was only a natural inclination, as the motors were to be either our salvation or our destruction.

Yet, though only one of the motors had coughed suddenly in the midst of that cheerless rain-soaked afternoon, and we looked at the bright side even of possible trouble with the starboard engine, insofar as the outcome was concerned, the prospect of tinkering with a misbehaving motor out there over strange sea, and in the midst of savage gusts, was not the least reassuring.

The cough ceased as quickly as it began. We were all ears.

Was it only a passing irregularity? But no. It came again, definite and unmistakable. There was a splutter and a sort of kick. Nothing could be left to chance. We could not charge on through the rain disregarding that motor, and possibly laying the foundation of disaster. We started out to investigate. We did not for a moment believe that the cough was caused by a fault in the motor itself. The first theory that ran through our minds was that a defect had developed in the gasoline feed line. An inspection by Ulm discovered no visible trouble in the gas lines. It was possible, however, that rain had percolated into the carburetor stoves, and that this had led the starboard motor to dance a little.

At any rate, the revolutions of the starboard motor were normal at 1,600, and the oil pressure and temperature were right. Intermittently, for about eight minutes, came this discordant note in the roar of that engine. Then the coughs stopped abruptly. The roar, steady and rhythmic, swelled out as before. Ulm entered in the log probably one of the most historic jottings that the book contained. It read: "Starboard engine has quit shimmying."

At the moment, that entry was as pleasing to us as if he had to put down on paper that Fiji was in sight. Our altitude was 550 feet, and our speed 77 knots. All was well with the world. Yet the temporary irregularity of the engine had caused us to train our ears with greater concentration, for a possible renewal of the "shimmying." That, too, was but a natural result of the scare. The rain seemed to get a little lighter, and at 4.22 P.M. we had been eleven hours in the air for the day. Our estimate was that we had averaged 100 or more statute miles hourly. Lyon worked up the longitudinal position, and in a note that he passed through he told us that at 4 P.M. ("Southern Cross" time) and 4.25 (Honolulu time) we were in Latitude 7° 27′ N. and 167° 30′ W. Longitude. We had covered 1,026 nautical miles at an average hourly speed of 106.55 miles.

We had now broken free from the wet cloud banks, the rain had stopped, and although a thick haze lay along the horizon ahead, it looked as if we would have a clear night with good flying conditions. We felt that we certainly deserved such a night, as from before noon the rain had made our lives miserable.

We plotted our probable progress, based on the favorable outlook that the checking of our longitudinal position had given us. Given favorable conditions, we believed that we would pass over the Islands of the Phœnix Group that night. It was then 6.10 P.M., and dry, all except our feet and legs, where the water had cascaded on us from the windshields.

Again our forecast of a fine night went astray. When you are bowling along at a ground speed of 85 knots, you sometimes overlook the fact that great sweeps of sea are being left behind rapidly, and that while the weather indications may look promising at one point, two hours' flying further on may bring you into the foulest of weather.

It was so with us. As the daylight began to wane fast, we started to climb for our night flying. This was our settled policy, as it was safe at a good altitude, and, in addition, it was the means of prolonging the day. High up there we had the advantage of the rays of the sun as it slid under the horizon, even though darkness may have fallen completely at the ground or sea level.

The clearness that had appeared ahead was now no more. New mountain peaks of cloud heaped up on the southwestern horizon. They were thick and dark. We climbed steadily at 69 knots. We expected that we would get above the menacing peaks at 5,000 feet, but we had not pulled up to more than 1,200 feet when rain burst on us once again from the foothills in this vast range of cloud. We opened up the motors to 1,700 revolutions, so that we could climb more rapidly, and at the moment had to swing right off our course to fly round a wall of rain of tropical violence that charged right at us.

We began to fly in circles always steadily upwards. This was the sort of thing that always reawakened those qualms about the terrific drain on our gasoline. We probably in our mental state on this occasion exaggerated the thirst of those motors when they began to haul the heavy load aloft, because it was one of the longest and most strenuous climbs of the whole flight.

There was always, too, the feeling that while we were seeking to soar over these cloud pinnacles we were getting nowhere. Progress was cut down to a few miles. It was a breathless race between the "Southern Cross" and the clouds. First we gained, then they puffed up beneath the plane. Rain battered at the windshields, and the wind seemed to stand off like a boxer and punch us. We had been battling upwards in this way for about ten minutes, when the flexible lead of the exhaust pipe carried away off the center motor. No damage was done, and we did not worry unduly over the incident. As long as nothing more vital fell off we were quite at ease in mind. As we climbed the rain grew worse. It slashed and tore against the windshields. The clouds seemed to get blacker and thicker the further we struggled aloft, and for the fourth time since we left Barking Sands we were flying blind.

In the midst of that cloud bank it was as black as the blackest night, yet the altimeter told us that we were climbing at the rate of 250 feet a minute, and at 6.20 P.M. we had mounted to nearly 2,000 feet. We burst out of the first prison house of clouds, and found ourselves above the lower ranges of them. We could see about us again, and the dying sun lit up the tumbling cloud masses in a picture as striking as those that we had seen just before we reached Honolulu. But there was a difference. It lay in the fact that there was nothing kindly in these great cloud valleys down which we looked from the sides of the cockpit. They were the color of heavy coal smoke, and inspired a certain amount of awe. And the rain was dogging us for every mile. It often blotted out everything, and our damp feet and legs grew more damp as it tumbled in rivulets over the windshield.

We were forcibly reminded of the 2,500 miles of rain through which we had battled on our 7,500 miles flight round the Australian continent. The rivulets coming over the windshields turned to rushing cascades, and we got sodden from the knees down. At 5,000 feet, and after a sudden swing almost at right angles to our course, we shook off the clinging rain clouds, but there were still higher mountains of cloud before us, and the haulage was heavy on the three roaring motors.

From this point, a little after 7 o'clock in the evening, it became a tense race between the "Southern Cross" and the clouds to reach 10,000 feet. Only such an altitude we felt would carry us into clearer flying conditions. At 7.15 P.M. we had reached 7,500 feet, but there was none of the sunset glory that had enlivened our lot a little on the previous hop. Inky blackness, rain, and capricious winds made up the cheerless outlook for the night. So it was with the greatest fervor with which anything was ever penned that Ulm included in the log the sentence "we see a rotten night ahead." Clouds completely surrounded us, and we passed through another of those frequent periods when we were unable to take our bearings. It rained hard in bursts, and we kept flying in circles.

But after a long and grim fight we won that race. At 8,000 feet we had beaten the uprush of the cloud banks. We looked down into a world of tumbled vapor, ranging away in ragged fringes on every side. Yet the struggle up there through the cloud masses was well worth the reward that awaited us when we scaled them.

Above us as we emerged from the murk, glittered the Southern Cross, the constellation whose name we were proud to bear on our ship. It winked out a genial welcome to us after the stress of the battle far below. It glimmered on the port bow like a shower of diamonds in a vault of the deepest blue. There were other stars there too, of course, but we hardly saw them. The Southern Cross was to us the symbol of success. It seemed to hang there beckoning its namesake with the three droning motors. It looked good. We were still far from our goal, the sea swept by, the tangled cloud wreaths far below looked just as relentless, yet the sight of the Southern Cross seemed to give us the impression that the worst was over, that we would win our way through to Suva.

CHAPTER XII

LOSING GASOLINE IN THE CLOUDS. WE CROSS THE EQUATOR. NO SIGN OF PHŒNIX GROUP. LANGUOROUS TROPICAL NIGHT TURNS TO ONE OF SAVAGE RAIN. BUMPING THROUGH.

JUST after we had been cheered by the sight of the Southern Cross, our elation was followed by a doleful reflection on the amount of gas we had lost through the climbing above the impenetrable plain of clouds. We estimated that we had lost a good hour's flying in breaking through those darned clouds. This was always a problem that provoked serious thought. The higher and the thicker the cloud masses were that we met, the more gasoline we would lose from its main purpose—that of driving the plane forward over the long ocean trail. It was patent that if we met too many of the mountain ranges of cloud, our gasoline was going to diminish to such an extent that we would have a stern fight to reach Suva.

It was possible to fly reasonably low under some of these floating cloud masses, but others piled up before us in a fearsome way—mighty Mont Blancs of vapor. There was no alternative but to face tedious and totally unprofitable mountaineering among these rolling masses. So it was that we were not in the poetic mood to enjoy any of the sublime cloud formations and vistas that rose and opened up all round us. We were concerned more with the state of the declining spirit in those tanks than in pictures of cloud beauty.

Just before 8 o'clock in the evening we began to glide down, and swept into a warmer stratum of air. We were still above the vast topography of clouds ranging away apparently to the horizon on every side of the plane. Yet above us was a most tranquil and blue firmament. It was crusted with stars that flashed like jewels in a canopy of velvet. More stars popped out each moment, and the peaceful conditions were in striking contrast to the turmoil of wind and rain an hour earlier. The wind still blew freshly and slightly against us, but we looked forward to a more kindly night than had been promised when we fought those clouds.

When the moon rose and set our ghost plane dancing again on the hills and through the valleys of cloud, we had the leisure once more to relax a little. We were skimming the clouds at a speed of 74 knots. We both took turns at dozing or at least lolling back in our wicker chairs in a listless way, which was the nearest approach to rest that was possible with the ceaseless pound of the motors.

In this way three more or less uneventful hours passed. For that we were thankful, as the rush of incident since noon had been a little wearying on the nerves.

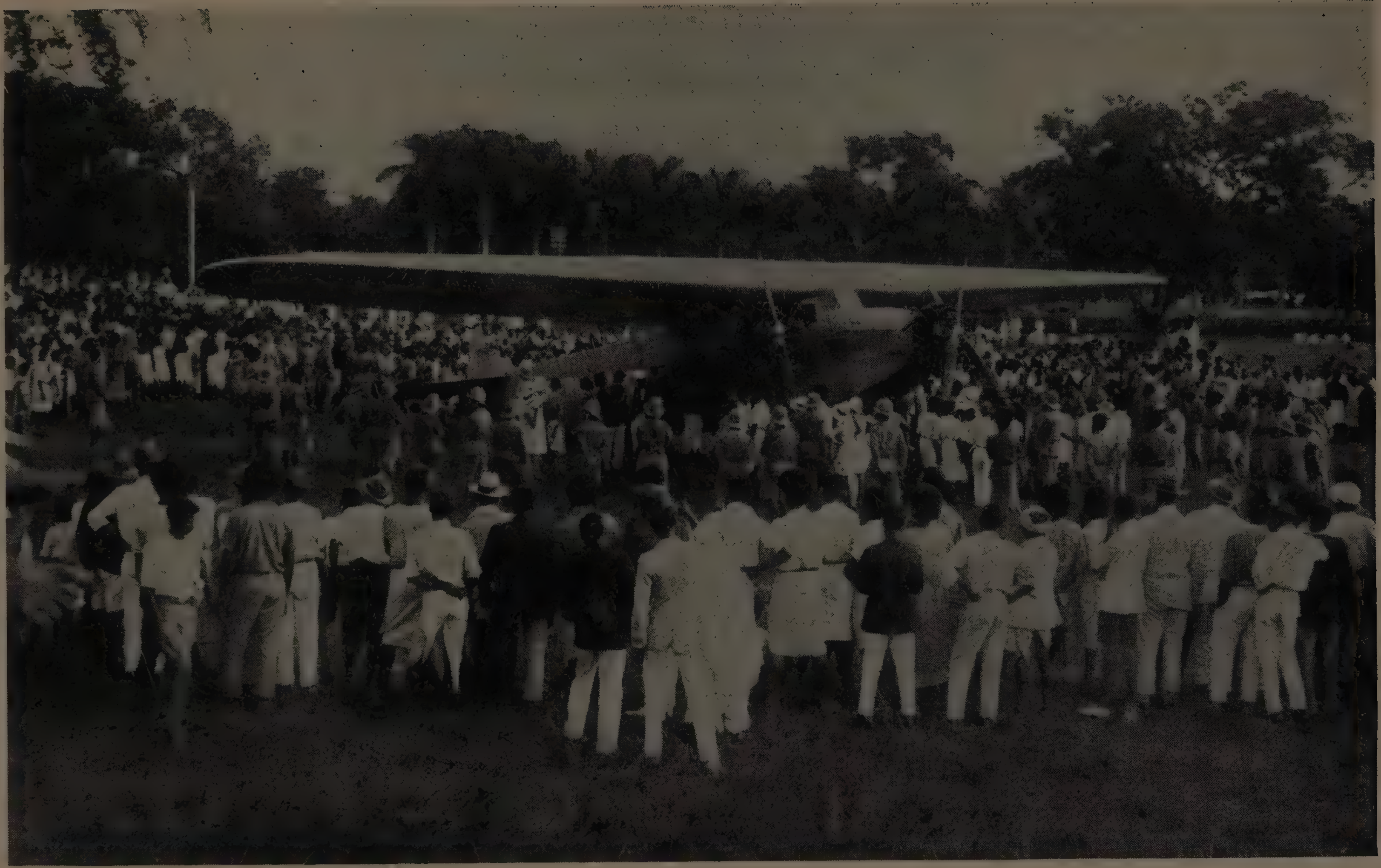
It was 11.33 P.M. when we lived another of the many red letter moments of the flight. Lyon passed through a note to say that we had just swept across the Equator. Again there rose in us the growing feeling that complete triumph would be ours. We were in our own hemisphere once more. We were slowly mastering this great tract of unflown ocean. This fact and the benevolent twinkle of the Southern Cross beckoning us on, put everybody in the highest of spirits.

Then our instrument dash light by which we illuminated our instrument board failed. It was ever thus right through the flight. Just as we were soaring mentally into the seventh heaven of delight by unusually good progress, or by reaching a definite milestone like the Southern Cross constellation, something, mostly minor things, went against us. It was as if various circumstances joined to check any vainglorious thoughts that might have been fluttering in our minds. Once it was the supposed gas leak, then the cough in the motor, and now it was the instrument light. For a time we had to use a hand torch to consult our instrument board.

Till midnight we sped on above the glimmering track of the moon. White-capped waves tumbled away it seemed to the end of the world, glittering in the moonlight. Far ahead, however, gray mist banked up much to our disappointment. We had been thrashing our way through a typical tropical night since we broke through the wet belt. There was a warmth in the air, and a general atmosphere over this equatorial sea of the kind that novelists delight in writing about. It was indeed one of those nights that Stevenson or Conrad would have made the setting of a masterpiece of fiction. But for us the languorous tropic sea was singularly lacking in islands.

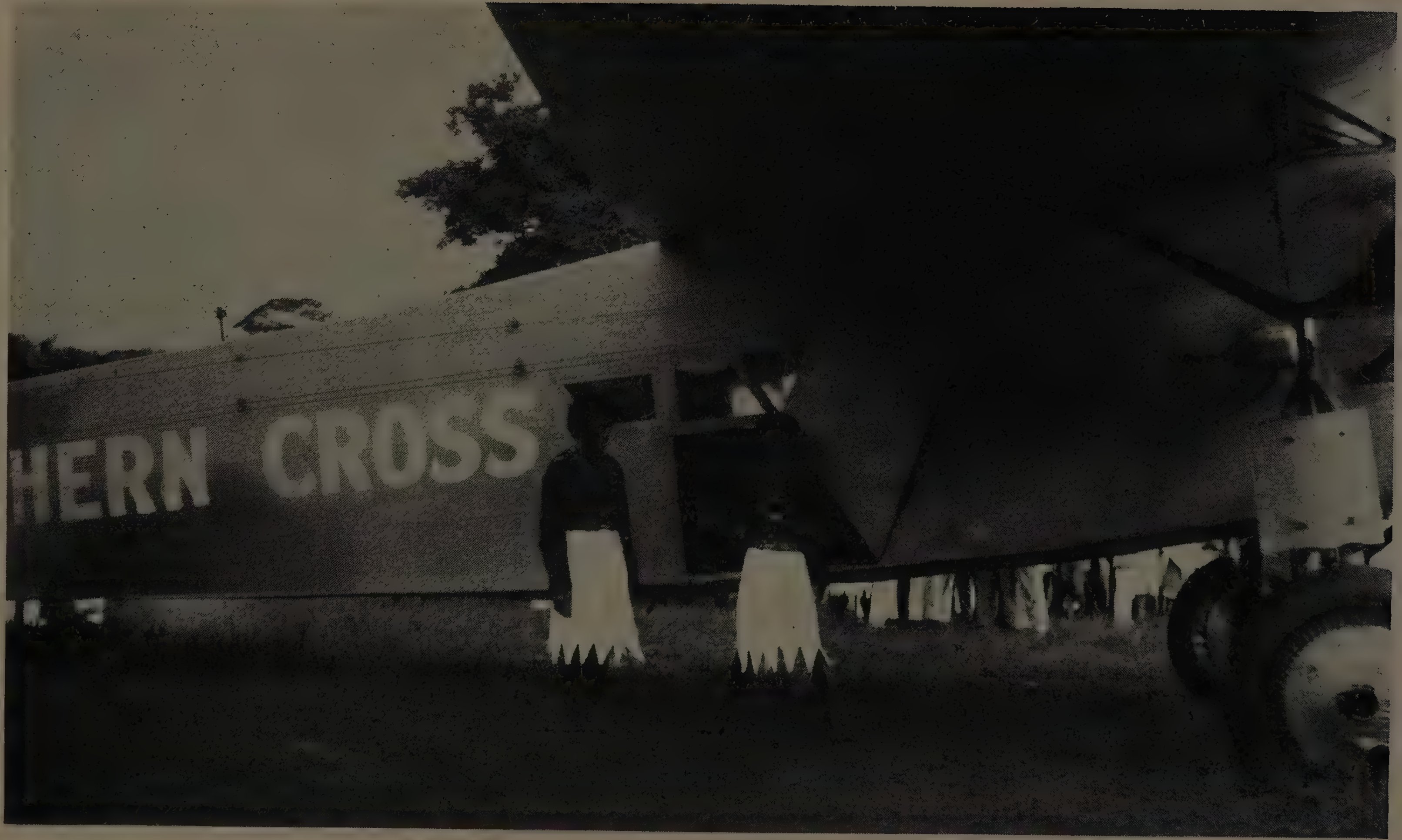
At midnight (or 11.10 P.M. ship's time) we felt that we should have been over the Phœnix Group of Islands. Not a vestige of an island broke the endless sweep of the sea. For an hour we scanned the ocean for those elusive islands. There were dark shadows ahead and abeam, but they always drifted off in mist, and nothing solidified into an island.

Lyon's dead reckoning indicated that we had worked off our course, and a little after midnight he set a new course direct for Suva, and we swept for-



AT SUVA IN THE FIJIS

The Fijians view with awe the "God from the Air" while British troops stand guard.



NATIVE CONSTABLES GUARD THE "SOUTHERN CROSS" AT SUVA

So efficient did the native guard prove, that the flyers were unable to approach the "Southern Cross" during the night.

ward at 74 knots. The motors were sounding as harmonious as ever. The slight cough in the starboard engine had never been repeated. We were now nearly 20 hours in the air, and were still going strongly.

From 1 o'clock to 4 o'clock on that tropic morning were hours of monotony. Our eyes were again beginning to feel dragged and worn from lack of sleep. We were slowly drying out in the waves of heat from the engines after our earlier ducking by the leak of the windshield. The moon kept us company sociably, and we left the glistening ocean behind at the rate of 77 knots an hour. Conditions generally were so kind that we were able to give each other longer rests from the controls. We lay back there on the chairs in a kind of stupid doze in air that was warmed a little too ardently by the gusts from the engines. We were still out of our fur-lined overalls, and were practically in our tropical kit.

Five o'clock came, and with it two new diversions. Ahead, great tangles of cloud blotted out the moon, and a splash of rain set the rivulets running again on the windshields. Ulm gulped at a thermos bottle of coffee that had gone bad. He had a half hour of rueful regret, and was prompted to write in the logbook: "We'll be thirsty lads before we land." We figured that we would reach Suva in another 7½ or 8 hours, but our speculation was checked when the wind whipped up again, and showed a desire to box a few more vigorous rounds with the "Southern Cross." And the bumps it gave us in the opening sparring!

The plane dropped in a sickening way. Then it slid and rocked enough to rattle one's teeth.

And the tropic night of moonlight and languor! Where was it?

It seemed to vanish just as a painted scene is changed on the stage. Rain swept up, and the range of vision steadily contracted till there was no range at all. We plowed on through the dismal prelude to the dawn. The air was heavy with the heaviness of the tropics, and the rain rushed down in sheets.

Towards 6 o'clock on that dirty morning, we peered through the rain at a much more menacing storm far ahead than any that had ripped across our path. It appeared to be about 12,000 feet high. Lightning slashed open the heavy black rain clouds. It lit up the sea in a livid glare, and the wind blowing out of the vortex of this tumult punched us harder. The "Southern Cross" plunged on sturdily, but bumped and rocked heavily, pitching us about. In the navigator's cabin these bumps often threw Warner and Lyon against their tables and off their chairs. Torrents of rain flayed the plane, and although the big storm was still some miles away, we were getting the bumps from the wild air currents that rushed out from its center.

The height of this disturbance made it out of the question to try and climb over it to miss it in that way. We decided to glide down and try to get under the storm or around it. The lightning flashes that illuminated the cockpit and lit up the instrument board as if it was a sunlit noon showed that it was one of those electric tropical storms of which Jules Verne wrote so vividly.

Bumping in much the same way as a motor speed boat bucks across the waves we slid down from 1,300 to 400 feet. It was a fierce battle with the clouds, and even at this low altitude we could not free the plane from them. We were forced so low finally about 6.10 A.M. that we had to ask Warner to reel in the wireless antennæ.

Warner and Lyon had a bad night in the navigating cabin. Harry sent through a number of notes. He wanted to know what the bucking was about, and how were the engines, and would the gas hold out?

In our attempt at flying low under the raging storm overhead we did not meet with much success. The lower we went, the lower dropped impenetrable curtains of cloud. Once more we found ourselves in the cloud dungeon flying blind. There was nothing for it but to start to climb again. Pulling up through the dreary grayness we occasionally had respites from blind flying, but they were only short lived. As we pulled up and the motors flung themselves into the steady haulage we again thought of the gas. It was the sort of thing that played the very hell with consumption.

Just before dawn came another of those tense conferences about gas. Again the estimates clashed. Kingsford-Smith thought that after all the dodging of rain squalls that we had done the gas would fail us just before Suva. There could be no question about the severe drain that had been caused in two or three of our climbing and dodging exploits. Yet Ulm was the optimist, and was convinced that it would see us through. Actually we had about seven or eight hours' gas left. Yet there was just a disturbing doubt in our minds whether we were on the right course. We had dodged clouds and storms and circled and climbed, and it was hard to know definitely whether we were following that right track to Suva.

Seven or eight hours' gas might not leave us a reassuring margin if we had wandered a little from our course. So we pondered over gas and steering, as the first flush of dawn began to light up the sky astern. None of us were sorry that the night was over. It was a night that we described in the log-book without either apology or modification as being "a rotten night." It had hardly a redeeming feature.

And there was nothing roseate about the dawn that we faced. It rained hard; it blew hard, and the tropic languorous warmth had been supplanted by a cold snap that bit into our feet in the cockpit. Lightning flickered across the cloud masses ahead, and it also rent the mists far abeam. Yet the "Southern Cross" bucked into it with the same obstinacy as had carried the plane over more than 4,200 miles of ocean.

Our altitude as the darkness began to lift from the water was 4,500 feet, and the engines were giving us a steady 70 knots an hour. Ulm believed that we would make Suva. Kingsford-Smith preserved an open mind on the possibilities. By 7 A.M. we were treated to one of those amazing contrasts that are found in the tropics. The plane was punching her way through heavy rain, lightning flashed, and the wind smote us with joltings, right and left. Yet, far astern, the growing dawn was lighting up the clouds in pink and gold in a picture of rare beauty. Lyon got busy with his instruments, and sent us a message that the Dead Reckoning position for 6 A.M. (ship's time) left us 690 nautical miles from Suva.

We were not allowed to study the tropical weather contrast for long, because at 7.15 A.M. we were flying blind again. The clouds and rain engaged us in another close siege. We could see nothing. All the practice of Kingsford-Smith at blind flying was standing the party in good stead in these black spells. In this particular patch of blind flying, however, our discomfort was greater than before. To have the world reduced to an instrument board rocking in front of you in a black void is bad enough. But to have that instrument board plunged into darkness in keeping with the general gloom was infinitely worse. This is what happened to us in the twenty-seventh hour out from Kauai. The dash lights would not act, and we had to follow the advice that the board gave us by holding a flashlamp over it.

Eight o'clock saw us bucking into a head-wind that swung and chopped. We were tearing into the teeth of the wind at 75 knots, and an altitude of 8,500 feet. This was mopping up too much gas, so we began to glide down again as close to the sea as possible, in order that we might fly under clouds.

Nine o'clock saw us still fighting the wind, scurrying through the rain and getting many a jolt. Our rosy hopes of making Suva faded a little. We felt reasonably sure that we would reach land, but the odds seemed to be swinging against Suva. The head-wind shipped up with greater force, and we instructed

Warner to send out our position on the short wave regularly.

Ten o'clock saw us ready to cheer for joy. We decided to hand-pump gas from the main tank to gravity, and found that we had seven hours' gas left. After 30 hours in the air, we were slipping along at 75 knots. Smith had flown the machine seventeen hours, and Ulm had the controls for thirteen hours. We kept down to about 800 feet from 10 A.M., and our hopes of making Suva rose again.

We were both feeling the physical strain of the grueling night through which we had passed. We sat there in our chairs almost limp and listless. The continual heavy bumps and lurches, the endless thrash of the wind, and the climbing and blind flying had sapped our energy to a very low ebb. With smarting eyes and weary frames, we faced the clearing of the dirty weather that had dogged us all night.

CHAPTER XIII

WE MEET THE TRADE WIND. A HEAVY TASK TO KEEP ON OUR COURSE. WHERE THE EARTH CURVES. FIJIAN ISLANDS RISE AND SINK. ENCHANTED PATCH OF THE PACIFIC. WE LAND AT SUVA.

PROBABLY 550 miles from Fiji we met the southeast trade wind. It was not a sociable or friendly meeting. In fact, it was the hostility of this steady wind that caused our differences of opinion about the consumption of gas.

There was never any really grave doubt in our minds that our gas supply would see us through to Suva. We had made our plans and estimates on the fixed policy that we followed right through, of preparing for the worst while being ready to be truly thankful for the best conditions, or even moderately good treatment by the elements. And when we looked back on the night of rain squalls and bumps through which we had passed, we believed that we had actually encountered as rough a deal from the weather as it was possible for it to give us.

Had our estimates been made on our flying power in still air, the discrepancy would have been staggering, and our chances of reaching Suva remote.

For 500 miles that southeast trade wind flung its full weight against us at an angle of about 30 degrees. It blew at from 30 to 35 miles an hour with a consistency that did not in any way help to calm that incipient fear of ours about the gasoline. At times it became practically a head-wind, but for the most part it pushed against us obliquely, punching the wing with fierce gusts. This continual pushing of the wind in this way, hour after hour, considerably lowered our ground speed. In climbing through the cloud banks and dodging the storms that leapt on us during the night, we had used at least 40 gallons of petrol from which we had gained no progress.

And so we faced a dirty dawn a little uncertain about the gas supply, and a trifle uncertain, too, whether we were on a direct course to Suva. In the navigating cabin Harry Lyon had experienced a strenuous night. He was quite unable to get a decent sextant shot for our position with the rain smashing in on us in a deluge and the wind slapping the wing and making the ship buck like a broncho. There was no horizon and no visibility during several of those grim hours before the dawn.

How far we had drifted in that night flying that had involved circles and climbing, banking and gliding, none of us could say, nor could we even hazard a guess. We might conceivably have been a hundred or two hundred miles from our course to Suva for all the definite facts we had to the contrary.

It was useless to fling out light flares, because for the greater part of the night we were flying either in the center of cloud masses or under heavy canopies of black cloud. We could not see the ocean, so that neither light flares nor the crests of the waves could be employed to detect our drift. We simply had to wait till the dawn and a possible clearing in the murk to take a "shot." We awaited that dawn with a certain amount of trepidation.

Where were we? How was the gas?

These were the questions that kept on recurring to us. They were questions that were now vitally related. We felt sure that the gas was sufficient, provided that we were on our proper course. If we were 50 or 100 miles astray, then the position was vastly different. That was the only hazard. We were flying in those early hours solely on Lyon's dead reckoning, and were hoping that it was correct.

As we were bucking into the south-easter, and getting many a sickening bump, Lyon passed through a message that was characteristic of that cheerfulness of his, that not even the most dismal conditions could effectively damp. He told how Warner and he had decided by resolution at a meeting in the navigating cabin that they would have Kingsford-Smith elected President of the United States for the way he had plowed through the cloud-banks and squalls during the night. Warner and Lyon had not had experience of really adverse flying conditions until that night, as the hop to Honolulu was a pleasure jaunt in comparison.

They were quite accustomed to straight ahead flying, such as the glorious weather on the first stage of the trip had enabled us to do. But when we began to swing out of the way of the tearing torrents of tropical rain that massed ahead as if intent on engulfing the plane, they did not always know what was happening.

Similarly, when we turned, as we were compelled to do often, practically at right angles, they probably passed into a mood when they were inclined to question our sanity.

"What the hell are you doing now?" was one of the notes Harry Lyon sent through to us.

"Where the hell are you going—are you turning back?" was another of his appealing messages.

We could appreciate Harry's discomfiture, particularly if he was seeking to make any observations at the moment of these swift and sudden changes in our course. But the gloom and puzzling uncertainty that these necessary antics of the ship might have caused was dispelled as the weather cleared and the sun shone on us once more. Harry was able to take a "shot" for our position, and he discovered that although we were slightly east of our direct course to Suva, we were not any farther out of course than we had supposed. In fact, we were following the line that we had estimated we were probably following before we had the definite observation to determine the point.

This was indeed a ray of sunshine after a night of Stygian blackness and gloom. But another similar ray of mental sunshine was to brighten our lot a little later.

It arose, as usual, from the all-important question of gas supply. It is an amusing incident to recall now in the light of after events, but it was anything but comical at the moment. When we pumped gasoline by the hand-pump we could see the spirit actually pass along a flue of glass that ran almost level with our heads in the cockpit.

At the first of our energetic pumpings the petrol gauge showed nothing!

"This looks pretty bad," we said to each other, and we eyed the glass flue eagerly to see what would happen there.

Spirit crept along the flue. We stopped pumping and started again.

Once more the bubbles of gasoline crept forward. We tried the same experiment several times, and always the spirit showed itself in the same way. Then we pumped steadily. The gasoline worked across the flue in a consistent flow.

Yet the gauge told us that we had reached a point in our gasoline consumption that was actually less than zero. Here was a most encouraging development. The course was right, and the gas was right.

But where was Fiji?

We had been 32 hours in the air, and we felt that it was high time that we sighted land. Before us stretched a mirror of turquoise, broken only by the white crests kicked up by that southeast trade wind. It had now swung almost dead against the ship. With our great spread of wing we often got a savage jolt as the wing tip picked up a puff of contrary wind, and we fell or rose on the invisible hillock of air that was formed. But nothing suggestive of land could we see.

Our eyes were smarting from lack of sleep, but otherwise we felt quite fit. The thrill of approaching the first real triumph of the flight was a circumstance that put sleep out of our minds, in spite of the fatigue that the battle with the squalls had caused during the most miserable night. Our hands were begrimed with oil, and we decided there out somewhere beyond Fiji that in any future flight of a similar kind, we would install tiny basins of water and attach sponges to mop the eyes and face, and restore a little of the lost snap and brightness that the rigors of such a night had exacted. That grubby feeling about the eyes was a greater discomfort than the crushing monotony of the tranquil hours before Honolulu.

We could see nothing but the blue mirror and a light haze ahead, but the heavy atmosphere was undoubtedly the languorous heat of Fiji. From our passage across the Equator right on down the southwest course, the sogginess of the atmosphere had driven us to become more tropical in our clothes. Lyon and Warner had flung off the heavy sweaters in which they set out from Oakland, and now did their work with shirts open at the neck.

We had got down to the lightest attire we had. Our coats were off, our overalls were off, and we flew for many hours with the fronts of our shirts open and our chests bare to the slap of the southeast trade wind. Even while the rain poured on us in torrents in the early hours, the air seemed to weigh tons.

For three hours we glided steadily across the tropical sea of deep blue and flashing in the glare of a sun like burnished copper.

Then came the next memorable moment of the flight.

Our eyes were strained for the first glimpse of the dot that was Fiji. It seemed as if the dot would never show up. So much had we been told of the long shot that we were making for a dot on the map, that we began to think in terms of "dots."

But at 1.10 P.M. Fiji burst into view, not as a dot, but as a small brown dome, minute enough 70 miles away to be a silent traffic cop set in the ocean!

Ulm was at the controls. Smith was dozing. Ulm was not expecting land exactly at that moment, when suddenly far ahead on the starboard bow a small dome sprang up from the sea.

It was gray-brown and vague. But the drifting clouds were not thick enough for a brown cloud bank to hang down on the surface of the sea.

Ulm swung the plane for it. The sudden oscillation woke Smith, and his language was forcible and full of color. He thought Ulm had fallen asleep at the controls. But when he peered through the windshield his wrath vanished. It was land!

There lay the first of the Fijian Islands far out silhouetted against the angry glare of the sun.

We nudged each other in delight. We still had gasoline to carry us for five hours.

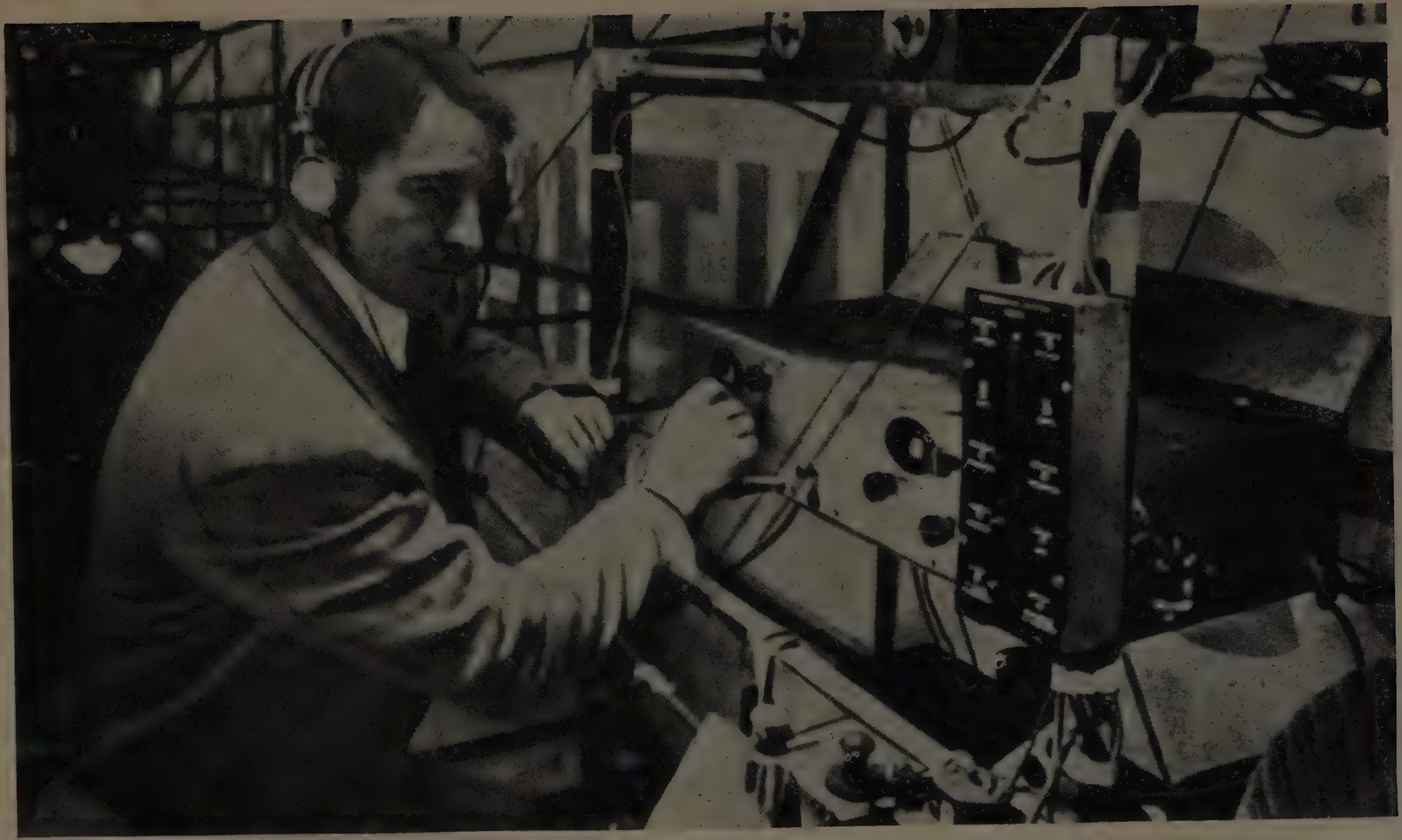
Our big goal was in sight. We were on the verge of triumph. We had pioneered a new ocean airline of 3,100 miles. It was a dramatic moment on the "Southern Cross."

The sea dozed lazily in a tropical heat, and the sun was high and relentless. We turned the nose of the plane straight for the small brown dome that grew darker and splashed with a bronze green as we tore across the gleaming sea towards it. As we swept ahead another small gray-green dome popped up to port, and in the great water lane between these two distant islands other green domes appeared, until the ocean seemed to sprout a rampart of islands right across our path.

We resolved to pick up our latitude bearing with a natural horizon, the first we had at our disposal in such kindly conditions since we left Kauai. Harry Lyon climbed on to the rear edge of the cockpit to take the sextant "shot."

We glided down from 750 feet to about 20 feet above the flashing surface of the sea. We were never closer to the water during the whole flight than at this historic moment.

As we did so, the rampart of islands vanished. They seemed to plunge into the sea! Nothing ranged away ahead, but the endless sweep of water glistening in the sun.



JIM WARNER TESTS HIS EQUIPMENT

The radio apparatus installed in the "Southern Cross" was the finest obtainable and proved of inestimable value to the flyers.

CAPTAIN HARRY W. LYON AT HIS POST

Harry Lyon, Navigating Officer, working out his position at his post in the cabin.

"Where have those islands gone?" asked Ulm, in dismay.

They certainly had gone.

All the gray-green hillocks out there in the light mist ahead were swallowed up as if they had been islands beckoning us from a desert or tropical ocean mirage. There were no islands or brown domes on the horizon.

We now saw the Pacific in quite a new aspect. The turquoise plain on which we had looked down from the higher altitudes had turned to an emerald green, flecked by lazy white caps.

But where were the islands?

Harry Lyon, taking his sight, however, only chuckled. He knew almost every roller in the ocean we were crossing. He knew, too, that the islands had not been swallowed by the sea in some earth convulsion. He knew they were still where we had first sighted them out there sixty miles ahead, dozing in the glittering heat haze.

The reason they had suddenly sunk down into the sea was because they were obscured by the curvature of the earth. This was one of the most intriguing features that were associated with our approach to Suva. It has intrigued passengers on steamers in much the same way. While we were skimming along at 800 feet, our field of vision was such that the islands were clearly in view. As we sunk, however, we slipped down behind the marked curve in the earth in this part of the Pacific. That is why we lost the islands. They were on the other side of the curve.

On steamers a light on one of the islands is lost while the observer moves down three steps of a companionway. The curvature is 1.1 miles to the foot of altitude.

It was an uncanny picture—these islands swimming in the sun haze one moment, and then sinking to nothingness and leaving the turquoise ocean quite bare. We had not had such a strange experience since we had been deluded outside the Hawaiian Islands that dun clouds dragging on the sea were brown rocks.

Since we crossed the Equator we began to run against one indisputable geographical fact after another. Quite apart from the curvature of the earth, there was the crossing of the "mysterious" date line. Flying west we were twelve hours fast on Greenwich time, and dropped a day.

This interesting juggling of the times took place above the Island of Tavanui, which we sighted gliding towards us soon after we had again picked up the elusive rampart of islands. Tavanui lies on the 180th meridian, and it swept below us just two hours before we flew into Suva.

After Harry Lyon had got his sight we again lifted from our low altitude twenty feet above the tropic sea. As we climbed to 2,000 feet the islands that we had lost for half an hour now burst upon us closer, and in the full blaze of their beauty.

It was 2.20 P.M., and the proudest moment of our lives.

We were sailing along in golden sunshine between the smaller Fijian Islands and Suva.

Below us unfolded new beauties with every mile. Cultivated islands glided towards us over a green sea, revealing an amazing mosaic of colors—the light green of the cane-fields, the bronze green of the rubber plantations, and other fields, splashed with splotches of red and yellow and purple.

And the sea itself! What a sweep of emerald it was.

The water was so clear that from the plane we could see the white scoured sand below ten fathoms of pale-green water. From the cockpit the clusters of islands seemed to be studded over a vast shallow expanse of water rising from bases of white sand and gleaming coral white and pink. Yet the water was not shallow.

It was the same Pacific that we had seen and knew so well in many and varied moods. We had seen the ocean in its wrath, and now we saw it in all its picturesque tranquillity.

Far down below us glimmered the white roofs of the villages sunk in great billows of vegetation. Every green and purple island was girt by its crinkly ribbon of surf. The sand shone white and vivid under the ardent sun. And the coral islands—how they glowed and flashed down there where the long rollers of the Pacific thundered on the white beaches. We were indeed in the paradise immortalized by Stevenson.

Below us ragged walls of breaking seas upon the island reefs and the palms skirting the beaches seemed to tremble in the heat.

The further we glided over these languorous islands the more vivid blazed the color. The sea was as transparent as glass, save where it tumbled in on those beaches. Blacks and reds, greens and vivid yellows, burned in those coral islands and back in the dim bronze-green waves of inland bush smoke rose from native villages and trailed among the treetops.

For nearly eighty minutes we flew lazily above this enchanted patch of the Pacific.

But in keeping with those sudden changes in tropical weather the dazzling picture below us in a trice lost half its splendor. Heavy clouds drifted up from the southwest—dissolved over the islands, and the scene was smudged out in a gray shroud of moisture.

A splash of rain slopped on to the windshields as we passed over Koro Island, the last of the rampart before we reached Suva.

At 3.45, after 34 hours 23 minutes in the air, we swung in over Suva. Below us the white roofs glinted among great banks of trees and shrubs. Every house seemed to stand in the center of a grove of trees and on a hill the official residence of the Governor stood out against the deep bronze-green background of bush.

For us it was at once a moment of triumph and anxiety. Strange as it may seem, an airman's most tense hour is the last hour he is in the air. We were not half as anxious in our struggles with tropical rain and the slashing wind on the previous night, as we were just there skimming in over the thunder of the surf towards Suva.

What of the landing ground? That was our worry.

Would it be large enough?

The landing ground at Albert Park Sports Oval was barely 400 yards long. We had asked the local authorities to have the telegraph wires at the north-western corner of the ground removed. Three large trees had also been cut down to give us as clear a space as possible in which to land. Our old Flying Corps friends, Major Clive Joske and Captain Samuel Ellis, had put in place bold distinguishing marks long before we arrived.

There is no question that this was the most difficult landing we had to make since we owned the Fokker. After thirty hours in the air we were not altogether as bright as when we stepped into the cockpit at Barking Sands. The savage battering of the rain squalls, too, had added to our fatigue. An awkward problem for us was a sudden drop of ten or twelve feet from the road to the surface of the field itself. Kingsford-Smith had the controls, and he brought the machine on over the road at 65 miles an hour.

For a few seconds we had that nasty feeling that a crash was certain. The machine touched the ground halfway up the field. At the end of the field was a sharp rise clothed in trees and thick undergrowth. As we rushed on towards this rise, however, our hearts rose again. There was room there to swing to the left. Smith ground-looped the plane, and we finished our run without imposing any strain whatever on the machine.

We came to a standstill on the oval at 3.50 P.M. We had mastered the longest hop of the flight. In effect, we had, so to speak, "broken the back" of it.

We had covered the 3,138 statute miles from Barking Sands to Suva in thirty-four hours thirty minutes.

We looked on our air conquest of the Pacific as being complete. We had no qualms about the final and shortest stage to Brisbane.

CHAPTER XIV

SCENES AT SUVA. WE ARE DEAF AND DAZED. OUR TREMENDOUS RECEPTION. VIGILANT NATIVE GUARDS DEBAR US FROM OUR OWN MACHINE. WE SELECT NASELAI AS A TAKE-OFF PLACE. DIFFICULTIES IN THE WAY. WE CHAFE AT THE DELAY.

AGLOW with all the colors of a Persian bazaar was the crowd of people who surged round the little oval in the moist heat of the afternoon. It was a white and tropical garbed host that surged in about the "Southern Cross." An ocean of heads swept back and forth round the plane the moment the three motors stopped after their strenuous and sterling service to us.

They told us the gathering cheered with frantic enthusiasm, and that many a native fled to the security of the vegetation at our approach. Yet we heard nothing but the ceaseless thunder of the motors. Even when they were stopped their roar kept hammering dully in our ears.

In the wild rush to greet us the first to fight their way close to the plane were six or seven old war pilots who had cabled to us at Honolulu, and who had charge of the arrangements for landing. They dashed out from under a tree close to where Smith ground-looped the machine. At their heels ran a rope cordon of Defence Club lads, who encircled the machine with their rope barrier just in time to check the charge of the crowd. Then the Fijian and Indian Police flung their solid frames into the scrum or succession of scrums that developed about the machine.

As soon as we saw that our propellers were safe we climbed out of the cockpit. Around us swept a frantically excited crowd. A forest of hands shot at us as we appeared on the little ladder below the cockpit. Every one, European and Fijian, wanted to greet us at the same moment.

To feel our feet stand once more on solid earth was a supreme joy. To stand on the earth after having mastered the toughest and longest hop of the flight was the summit of felicity. We could not at the moment think of anything that could have given us greater pleasure, especially when our minds voyaged back, as they kept doing, to those disappointments and anxieties that were associated with the achievement of the ambition of our lives.

We felt dazed when we got down there among the people. We did not know for the first few minutes whether we were standing on our heads or our heels. Waving arms and open mouths, all shouting something at us, locked us in on every side.

But we could not hear a sound. We were stone deaf.

Men clasped our hands and shouted at us.

We grinned back at them we are afraid a little stupidly. But what could we have done. The pound of the motors was drumming in our ears, and it swallowed up all the kind greetings that the people showered on us.

Through the crowd pushed a motor car—the throng parting in a human lane to let it through. In it was a little man with a kindly jovial face. We learned later that he was the Mayor of Suva (Mr. Marks).

Another genial-faced man shook hands with us, and addressing himself to Smith said—so we heard later —"I hope that you and your companions will lunch with me to-morrow."

"Yes, isn't it," said Smith, whose lip-reading had interpreted the invitation to lunch as being a remark about the success of the flight.

Gripping his hands, and moving closer to Smith's ear, the man said: "Will you all lunch with me to-morrow?"

To this Smith was even further astray in his reading of the lips.

"Excuse me," he replied, "I didn't quite catch your name."

The man who was valiantly endeavoring to pass to us an invitation to lunch for the following day was Sir Eyre Hutson, K.C.M.G., Governor of Fiji, and High Commissioner of the Western Pacific.

The Mayor asked us all to be his guests at the Grand Pacific Hotel. We did not hear a word he said, nor did we hear his name as he introduced himself.

As we still stood there, dazed, deaf, unshaven and oilstained—a sorry-looking crew—the crowd was pushed back, and we were asked to pose for photographs.

With all the old world gallantry of a French vicomte, Harry Lyon kept saying to every one about him in turn: "Excuse our appearance, Sir."

Suva seemed to be going wild all around us. Europeans and natives split the air with volleys of cheering.

Then came a moment when they sought to take us away from the machine. We protested with vigor, as the throng that surged about us looked sufficiently excited to pluck off a propeller or some such trifle as a souvenir. Various people in authority bawled into our ears, and finally got the message through the waning engine thunder in our heads that the Police and the Defence Force were mounting guard over the plane, and that we could go and sleep in contentment.

And we needed sleep. Lyon's eyes were sunk in his head. Warner looked pale and cadaverous, and his eyes were half closed. Ulm looked at the point of exhaustion, weary in body and mind. Smith may have looked fresh, but he did not, as some friend suggested, look so bright that he could have flown for another thirty-four hours over the Pacific without a respite in bed.

Friends broke a way through the dense throng for us to the waiting motor cars. We deeply appreciated the marvelous welcome and enthusiasm of the crowd, but we were not in a fit condition suitably to express our thanks. We were too deaf and tired and grimy.

We got through to the Grand Pacific Hotel amid a great press of people. The Fijian crowd of 10,000 demanded a few words. We were thrust on to the first story balcony of the hotel with the Mayor.

We were glad we acceded to the request to get on that balcony perch.

Below us was an amazing scene. It was like a picture that might float into the mind in a dream after a long session with a gripping novel of the South Seas. A sea of faces surged and swayed down there in the midst of the feathery green leaves of palm trees. White faces, black faces, olive-tinted faces, and other faces not so black, gazed up at us through the palms.

Above, the rain had blown away and the sky was cobalt blue. Across a great carpet of grass gleamed our machine shining in the tropical sunlight with its ring of guards, whose zeal and fidelity was unexampled.

The Mayor made a brief speech welcoming us to Suva. Smith made an effort to reply, and then we were led off to bathrooms and a drink.

It was then 4 P.M., and before we went to bed for that much-needed sleep, we realized that we would have to frame our plans for getting away from Fiji on the last hop home. It needed only a few minutes for us to be convinced that Albert Park would be an impossible place from which to take off with a loaded machine. We had to look for another field. We had landed there with eighty-five gallons of gas left out of the 1,300 gallons that we had taken aboard at Barking Sands. But we did not at all relish the prospect of trying to take off from the little cricket oval with 900 gallons of gas.

Another mild crisis developed while we were in the bathroom.

Where was another suitable taking-off ground? The position was quite vague in this respect.

Three places were suggested to us. One was the beach at Navua, twenty-five miles by sea to the westward. The second was the beach at Naselai, twenty miles east, and the third was a field at Nausori, fifteen miles inland. We left it to our new friends to arrange for us to look over each of these spots as soon as possible.

Indications were that we might not be able to get away from Fiji for four or five days. This was a matter of grave concern for us. We always maintained that speed was the first essential in aviation, and that our flight would only be partly successful if we failed to keep reasonably close to our schedule.

A number of social engagements were arranged in our honor by the residents of Suva. We were utterly weary and anxious to push on. We felt we could with advantage. We had not the hearts to hurt our kind hosts, and we did not wish to appear unappreciative of the great welcome that had been given us. So we undertook to do our best to fulfill all engagements. We were glad that we did so. The warm-hearted kindness of the people of Suva was a revelation, and we would not have liked to have missed it.

We went to bed in borrowed pajamas. Smith was the only member of the party to fall asleep. The others were too overwrought and excited to sleep at once.

Soon after midnight we became wakeful, and began to wonder how the "Southern Cross" was faring. We strolled from the hotel across the park to the rope cordon round the plane. As we stooped below the ropes to walk into the enclosure about the machine, we were halted by the Fijian constables, who stepped from the darkness with their rifles. They could not speak English, but they motioned us away from the machine, and made it clear that neither we nor any one else could go near the plane.

Smith, at the time, was wearing an effulgent kimono that some one had lent him, and he probably did seem to be a queer apparition to the native police, roaming about the plane at midnight.

Here was the best possible evidence of the efficiency of the guard over the plane. It satisfied us. We went back to our beds.

We came down to breakfast on the morning of Wednesday, June 6th, full of pep. We felt like giants refreshed. We faced kippers and bacon and eggs with enthusiasm. It was our first real meal for forty-eight hours. We settled plans with Joske and Ellis.

The Government very kindly had placed its resources and its vessels at our disposal. We decided to divide forces. Smith was to leave with Joske in the Governor's launch, "Andi Beti," to look over Naselai Beach. It was a day's journey there and back over the open sea. Ulm had a big program to carry out. He was to go with Ellis to Nausori to see the field there. Then he was to lodge a number of newspaper and business cable messages. He was to attend luncheon with Sir Eyre Hutson at Government House, the Civic Reception, the Returned Sailors' and Soldiers' welcome, and the Defence Club celebration. He was then to be prepared to foot it lightly at a Mayoral Ball in the evening. Warner and Lyon were to support Ulm at these functions. Lyon made ready for them by buying a smart tropical suit. He emerged a chaste white and dashing figure in marked contrast to the unshaven Lyon, with the sweater and the flying helmet, who had stepped from the plane on the previous day.

Warner opened a busy day with the wireless experts of Suva, who helped him to get his generators charged, to find the fault in his receiving set, and generally to get his instruments in order for the final hop.

Ulm went with Ellis to Nausori, where Mr. Lord, Manager of the Colonial Sugar Refining Company, met them. They looked at two possible runways—one of 1,000 yards, which was very rough, and the other of 800 yards, with a good take-off across the Rewa River.

They estimated that a gang of 300 men with tractors and rollers could put it in order in twenty-four hours. Lord and Ellis undertook to find the men and the implements if they were required by dawn on the following day. The second field had a better surface, but it was smaller. Ulm thought that it would make a possible landing ground if Smith found nothing better at Naselai.

Ulm, Lyon and Warner attended luncheon with the Governor, Sir Eyre Hutson, who proved himself to be a perfect host. They were present later at the Civic Reception at Suva Town Hall, where speeches congratulating them on the success on the main hop were made by the Mayor (Mr. Marks), and leading citizens of Suva. After the reception they went up to Ellis' house on the picturesque heights of Tamauua, from which a prospect of emerald lawns and palm-crusted hills swept down to the harbor. There they met the ex-soldiers of Fiji and their wives. For an hour or more tea was drunk, and war memories and experiences were exchanged.

But pleasant as the little reunion was, the thoughts of Ulm, Lyon and Warner were on the absent Smith. We all yearned to continue the flight. This was a very vital point with us. We had forced the pace across the Pacific. We had kept on the move at Honolulu, and had to be quite determined about it, otherwise we would have been held up there probably for several days. Everything at Honolulu was done, so to speak, on the run, and we succeeded by this haste in getting away from Kauai on scheduled time. Yet, it was a desperate struggle. Dinner in Sydney on Saturday night was still our ideal. It was then Wednesday, June 6th, and only three days remained. A twenty hours' hop to Brisbane in the kindest conditions lay before us, and we had to allow for another full day to get down south to Sydney —another flight of about 500 miles.

So it was that our hearts fell when we heard of the distance of these possible take-off places from Suva, because it meant that the gasoline would have to be transported to the plane at whatever place was selected.

We passed on to the Defence Club, and drank a glass of wine with the chaps who had protected our machine at the landing. Night fell, and Smith had not returned to Suva. People were beginning to wonder whether the "Andi Beti," which is Fijian for Princess Elizabeth, had stranded on a reef, which would have involved a delay of another sixteen hours at Naselai. In the course of dinner at the Grand Pacific, Smith arrived, and there was joy in the camp once more. He brought back the verdict that at Naselai Beach was the best runway we had met with. So Naselai it was to be. Lord and Armstrong were told that we would not need the services of the 300 Indian and Fijian laborers to prepare the other runways. There was a dance in our honor that evening, attended by the youth and beauty of Suva. Lyon and Warner looked quite dapper in their blue suitings, but we must have appeared like Alaskan lumbermen or the film stars in a Western American film drama, as we had only the shirts, breeches and top-boots that we had worn when we set out from Oakland. We had brought no reserve clothes in the cockpit. Yet Suva overlooked our Hollywood appearance. We joined in the dance intermittently. There were many times when we were absent from the ballroom. Conferences with the Commissioner of Works and his foreman, with the master of the Government launch "Pioneer," with engineers and the Harbor Master, and the District Commissioner, who had jurisdiction over the natives at Naselai—all took place within sound of orchestra that played waltzes and fox-trots in our honor.

Then there were breaks from the ball to interview a dozen leading citizens whom Joske and Ellis had asked to help us in our take-off from Naselai.

Romance lingered round Naselai, which was selected without hesitation as our take-off for the Brisbane 1,508 miles' hop. It is the home of a small Fijian tribe far away from any white habitation. Never before had their domain been invaded by a plane of any kind, let alone a blue monster such as the "Southern Cross" must have appeared to them.

Petrol, timber, implements and everything we needed had to be loaded on to the "Pioneer" that night so that she could leave for Naselai at the earliest moment.

Back we went to the dance, and to our great surprise, the kind people of Suva presented us with a tortoise-shell casket that held 200 sovereigns. This money was collected for us in the town that day. Smith tried to tell the people how deeply touched we were and how welcome was their generous gift. After having witnessed various colorful native ceremonies we got to bed, thoroughly tired.

Our plan was to fly to Naselai Beach at 11 o'clock on the following morning, June 7th, to take aboard the petrol which then should have arrived on the "Pioneer," and to leave for Brisbane as early as possible in the afternoon. Our friends assured us that the plan would not be so easy to carry out as it sounded. The weather element obtruded largely into the speculations. The state of the tide was another factor, and also the amount of native labor that might be at hand for shifting the petrol. We realized that everything possible was being done to help us to get away in accordance with our plan, but it was only natural that impatience should worry us a little. We would have liked to have hopped off from Suva on the day after we arrived. Just as we had become misers of petrol out there between Barking Sands and Fiji, we now became misers of the hours. We begrudged every hour that passed with us out of that cockpit.

Thursday, June 7th, dawned a golden day. The tropical sun bathed Suva in a golden glare, and the white roofs of the town flashed like heliographs.

The sky was a deep blue vault, and we rejoiced that there was not a sign of rain which would have delayed our fueling. The wind was swinging across from the southeast, and was in our favor for the take-off from the small park for Naselai. We had intended to take Joske and Ellis to Naselai with us, but later thought that it would be wise to run no risk. We regretted the necessity for this decision, as we wanted to make some return to them for their kindness and their sterling services in our behalf. Smith decided also not to take Lyon and Warner in the machine, and left them to go across to Naselai by launch.

ACTUAL LOG ENTRIES—SECOND LEG

THE FOLLOWING ARE THE COMPLETE LOG BOOK ENTRIES MADE BY ULM DURING THE FLIGHT FROM BARKING SANDS, KAUAI, TO SUVA.

Arrived Kauai 6 P.M.
Inspected runway; same very satisfactory.
Commenced gassing and left same to Army.
Arranged for rations.
Discarded rubber life boat given by Navy.
Driven fourteen miles to Lindsay Fayes' home for dinner.
First shave since we left Oakland.
Consultation Smith and Ulm re the whole flight and decided to take 1,300 gallons gasoline.
Decided to set course for point 100 miles south on course from Oahu to Suva.
It has been hard work to keep to my schedule to arrive Kauai to-day, and leave there to-morrow.
Unforeseen delays always crop up; but Army and Navy coöperation splendidly helped us out. Eight Army mechanicians checked motors, all being perfect.
Army radio experts also assisted Warner greatly, checking up radio equipment.
We cannot speak too highly of Warner as an expert radio operator and man of initiative and resource.
Lyon spent hours yesterday with Naval Officers checking sextant, and apart from his skill he is our humorist.
Arose 3 A.M.
Breakfast.

Motored fourteen miles to Barking Sands.
Smith and Ulm finally inspect runway and plan our take off decision.
Arrange for Lowell Smith to be at 3,500 feet mark.
Warm up motors.
Do not wear heavy flying suits, as anticipate warm day.
All O.K. to start at 5.17 A.M.
5.22 A.M. Actually leave ground.
Revs. in air: 1,825. Take off distance, 3,400 feet.
5.26 A.M. Air speed: 86 knots. Revs.: 1,800. Altitude: 250 feet.
5.28 A.M. Get bad offshore bumps. Smithy handling ship beautifully.
5.29 A.M. Altitude: 350.
5.30 A.M. On Earth Inductor Compass course.
5.31 A.M. Smithy and self shake hands on successful take off on schedule time.
5.32 A.M. Last sight of Kauai on port beam from pilot's cockpit.
Moon going down on starboard beam.
All O.K.
5.33 A.M. Altitude: 400. Revs.: 1,750 all three engines.
Oil Pressure: 61 Pt., 60 Center, 62 Stbd.
Speed: 78 knots.
5.37 A.M. Altitude: 500. Revs.: 1,740 all three engines.
Speed: 76 knots.
Clouds far ahead.
Sun coming nicely up on port beam.
5.44 A.M. Altitude: 400. Staying down low to aid economical gasoline consumption.
5.45 A.M. Altered course few degrees to port to pick up beacon signals.
5.50 A.M. Warner asks for more altitude that he may let down long wave aerial.
Open up motors to 1,775 revs. Climbing at 75 knots.

Clouds ahead, but think we can safely fly under them.

Would rather not fly blind, so heavily loaded.

5.50 A.M. Altitude: 850. Revs.: 1,710.

Speed: 74 knots.

Warner reports "One generator bad." This is a little worrying, as radio was such a wonderful aid to our previous flight. Both generators appear to be running O.K.

6.00 A.M. Well, we are on the way, and happy.

Altitude 900, and now passing under low clouds, with more ahead.

6.11 A.M. Picked up "A" beacon signals. This very cheering.

6.17 A.M. Lyon sent me message reading "Australia, United States, the 'Southern Cross' and Mrs. Lyon's son Harry, are saved, as I have found my missing papers." I did not know he had lost them.

Revs.: 1,700. Speed: 74 knots.

Altitude: 625. On beacon; all O.K.

6.32 A.M. I am going to rest for hour or so, then give Smithy a rest at the controls.

6.52 A.M. Made first rough check on gas consumption. Believe same better than on previous hop. This due to our keeping lower altitude. Air speed now 76 knots.

Estimate ground speed at 84 knots.

Revs. 1,750. Altitude 850.

Lyon just passed up souvenir Boomerang.

6.55 A.M. Changed course considerably to starboard.

Apparently met beacon "T" Zone.

Sent message to Warner to raise weather report if possible.

Clearing up ahead.

7.01 A.M. Had a small scare. Saw what looked like gas leak in line behind Smithy's head. I flew while he investigated. It proved to be water formed through condensation of cold gasoline in pipe.

7.02 A.M. Warner reports we are on "T" zone of beacon. We apparently making excellent ground speed. I estimate 86 knots per hour.

7.35 A.M. The humorist, Lyon, gave me the following message: "The Aperiodic Compass has just snapped out of its trance, and is functioning right with the Earth Inductor."

Air speed: 76 knots. Ground speed: 84 knots.

Altitude: 600. Everything functioning perfectly.

8.15 A.M. Just finished my first forty minutes' turn at controls on this hop.

Air speed now 76 knots. Ground speed: 81 knots.

Revs.: 1,725. Altitude: 500 feet.

Very cloudy ahead and above; looks like possibility of rain. Visibility still good. Water still looks dampish.

Oil pressures and temperatures perfect.

All O.K.

Now about to attack the larder.

8.17 A.M. Message from Warner that beacon signals failed 8.15.

This is not so good.

10.05 A.M. Warner reports radio equipment completely out of communication and that he is working on it.

Altitude 550. Air speed 77 knots. Revs., 1,700 p.m.

11.10 A.M. Just finished relieving Smithy for fifty minutes at controls.

Altitude, 600 feet. Air speed, 76.

Revs.: 1,700 Pt., 1,725 Cen., 1,700 St.

Oil Pressure: 59, 55, 56.

Oil Temperature: 55, 55, out.

We miss radio communication greatly.

Wind is freshening up. I estimate now blowing at twenty miles per hour. Our ground speed must be at least 90 knots.

11.40 A.M. Rainstorm immediately ahead. We are flying around it.

11.45 A.M. Smithy flew round one storm. I flew around another. Now they seem to be closing in all round, so Smithy has controls again.

He has just seen a way through, and we may miss them.

Running into these storms when only 600 feet and heavily overloaded is no joke.

Here they are again—all round us. Have opened up motors to 1,775 revs., and now climbing through rain and storm.

11.50 A.M. Blind flying in storms—and what bumps!

Out of it now, but more ahead. Visibility only about 200 feet; ceiling nil.

Air speed: 76 knots. Altitude: 1,000 feet.

Gliding down, trying to get under this nearest rainstorm.

11.55 A.M. Altitude: 600 feet. Much clearer ahead.

12.30 P.M. Hon. time. 12 noon at ship. Lyon taking sight with sextant. We should know our latitudinal position in few minutes.

We are now seven hours out from Kauai, and Smithy has flown about 4½ hours, and self about 2½ hours.

Radio apparently still out of action, for no word from Jim Warner yet. But if radio can be fixed we know Jim will fix it.

12.40 P.M. 'Tis uncomfortably hot here. Smithy and self both removed coats. Just passing large rainstorm. Glad we missed that one.

12.45 P.M. Hon. time. 12.20 ship's time. Lyon reports: Lat. by obs., 12° 47′; Lat. by D.R., 12° 58′; Long., by D.R., 163° 13′.

Distance made good: 630 nautical miles.

Average ground speed: 90 knots per hour.

Hon. time. Revolutions, 1,675. Air speed: 74 knots. Altitude: 600 feet.

12.50 P.M. Smithy just flew blind through large rainstorm. I am taking controls over now.

1.15 P.M. Just flew through another rainstorm. We had missed them had we gone higher, but would burn more gasoline there. Altitude still 600 feet. Our fast ground speed is gratifying.

1.22 P.M. Warner reports that both transmitters been working O.K. for some hours.

3.30 P.M. Smithy and self been taking hourly shifts at controls and both had half hour's flight through low rain.

Just as Smithy took over controls from me, the starboard motor started to cough. 'Tis not a fault in the motor, but we are running on outboard wing tanks, and something is apparently wrong with the gasoline feed line.

3.40 P.M. Can locate no trouble. Maybe only rain in carburetor stoves. Anyhow, revolutions are normal at 1,600.

Oil Pressure: 58. Oil Temperature: 60.

Starboard motor has quit shimmying.

Speed: 70 knots. Altitude: 550.

All O.K. now.

4.22 P.M. Eleven hours in air to-day. Believe we have averaged 100 or more statute miles per hour.

4.49 P.M. Lyon working up Long. position.

Altitude: 600. Airspeed: 70 knots. Revs.: 1,610.

Looks like clearing up for clear night ahead.

To-day Smithy has flown six hours and I have flown five hours.

4.50 P.M. (4.25 Ship's time.) Lyon reports our position at 4 P.M. (ship's time) to be 7° 27′ N. Lat.: 167° 30′ W.

Distance made good 1,020 nautical miles, which is average speed of 106.55 m.p. hour.

5.00 P.M. Revs.: 1,610. Airspeed: 73 knots. Ground speed estimated at 85 knots. Altitude: 600 feet. Oil pressure: 60, 52, 51. Oil temperature: 58, 59, out. Visibility only few miles. Very hazy, but still looks like clearing up for a good night.

6.10 P.M. Have plotted our times ahead, and if present conditions continue, we should pass over Phœnix Group to-night. The daylight will soon be gone, and we are now climbing for our night flying. Thick heavy cloud banks are ahead, and above us. But I feel we will get above them at about 5,000 feet. Altitude now 1,100 feet. Speed, climbing: 69 knots. Ground speed estimated at 84 knots.

6.15 P.M. Now meeting with first of rain clouds. Have opened up motors to 1,700 revs. p. minute to climb more rapidly. Just swung off course to fly round a rain burst, and as I write, Smithy now turning back on course.

6.17 P.M. Exhaust pipe flexible lead carried away off Center motor. No damage. No worry. Now in heavy rain. Here's where blind flying counts. In thick clouds and climbing 250 feet per minute. Altitude: 1,850 feet.

6.20 P.M. Still in heavy rain, but above first layer of heavy clouds. Some of these cloud views are gorgeous.

6.30 P.M. This rain is rotten. Reminds us of 2,500 miles of rain we flew through on our 7,500 mile flight round Australia. The windshields are leaking, and Smithy and I are getting very wet too.

Altitude: 3,500. Airspeed: 69 knots. Still climbing.

6.50 P.M. At 5,000 feet we got above rain, but had to swing at right angle to course to do so. Still higher clouds in front of us. Still, think 6,000 feet will see us above most of them.

Altitude now 5,100. Revs.: 1,700. Airspeed: 65 knots, climbing.

7.03 P.M. For last ten minutes have been flying in circles to gain altitude to pass over high clouds surrounding us. Heavy rain intermittently. Altitude now 6,500.

7.05 P.M. 'Tis now a race between the clouds and the "Southern Cross" as to who shall reach 10,000 feet first. Smithy and I see a rotten night ahead.

7.15 P.M. Now at 7,500 feet. Still battling our way upward, and it is slow going with this heavy load.

7.31 P.M. Sighted the good old Southern Cross above our port bow. Moon up also. Alt.: 8,000. Above impenetrable clouds.

7.50 P.M. We probably lost an hour's flying in those darned clouds, but we are out of them now, and gliding down to warmer climes.

8.00 P.M. Stars are popping out all over the Heavens. But our group of heavenly bodies, the Southern Cross, looks best to us.

11.32 P.M. After each other had both had a refreshing doze—one doesn't really sleep when off duty on a job like this, but even ten minutes shut eye is helpful.

11.33 P.M. Lyon reports we have just crossed the line (Equator). Well, we are in our own Hemisphere again. Instrument dash light failed. Using hand torch. Height: 1,800. Airspeed: 74 knots. Revs.: 1,590. Misty ahead, good moon and stars. All O.K.

12.00 P.M. (11.10 P.M. ship's time.) Should be over Phœnix Group, but see no sign of them. Lyon sets new course direct for Suva.

4.55 A.M. Flew for an hour and half, and been dozing since. Will give Smithy a spell now. Hello—more rain and plenty clouds.

Alt.: 1,300. Airspeed: 77 knots. Revs.: 1,600.

5.00 A.M. One thermos bottle of coffee has gone bad. I drank some—very upsetting. We'll be thirsty lads before we land. I estimate we will reach Suva in another 7½ or 8 hours. Raining and bumping. Visibility nil.

5.51 A.M. Heavy storm, with lightning ahead, appears to be about 12,000 feet high. We are now gliding down trying to get underneath or around it. The storm is some miles away yet, we already receiving some bumps from it. It has been a rotten flying night all through.

6.05 A.M. Altitude now 400 feet. Bumpy. Clouds and rain forcing us fly so low that I just instructed Warner to reel in antennæ.

6.10 A.M. The night has apparently been a worrying one for Lyon and Warner, judging by the numerous notes Harry has been sending through asking what is the trouble. Will the gas hold out, etc.

6.12. A.M. Locked in the clouds again. Smithy flying blind intermittently, trying to climb above them again. This plays hell with gasoline consumption.

6.30 A.M. (Hon. time; 5.15 ship's time.) Smithy estimates that we are out of luck, and will have to come down before Suva, as gas won't last. Personally, I think we'll just about make it O.K. if we are on our course now. But we have had to do so much dodging about I doubt if we are on our course.

6.50 A.M. About seven to eight hours' gas left. Clouds, rain and lightning ahead and abeam, but dawn breaking astern, giving some wonderful color effects on the clouds.

Altitude: 4,500. Revs.: 1,550. Speed: 70 knots. I still think we'll make Suva.

7.07 A.M. Lyon D.R. position for 6 A.M. ship's time will have us 690 nautical miles from Suva. Hope he is correct.

7.15 A.M. Oh, what a cheerless dawn—rain, cold and blind flying at 8,000 feet. Smithy sure knows his onions at this blind flying. All the practice we had is standing in good stead now. As dash lights out I hold the flash lamp on the instruments during blind flying.

7.30 A.M. To conserve gas we are gliding down from 8,500 to sea level to try and fly under clouds. Looks as though we had a headwind now. But I guess we'll make Suva. Smithy and I were born to be hung I suppose.

8.30 A.M. (Hon. time.) Altitude: 500. Scurrying along through rain with heavy clouds ahead. Have just given Smithy an hour's spell. Bucking against head wind—very bumpy. Lyon and Warner say that they will have Smithy made President of the United States on their return, in recognition of his skill in the clouds last night. Airspeed now 77 knots. Revs.: 1,580. Gas left: About 275 gallons.

9.30 A.M. Very doubtful whether we can make Suva or not. But we should reach land O.K.

Altitude: 1,000. Revs.: 1,575. Airspeed: 78 knots.

All O.K.

9.50 A.M. Bucking against a direct head wind of fair force. Warner been instructed to send out our position on short wave regularly. We may just make it.

10.10 A.M. Whoops of joy on board, for after trying every tank and breaking gasoline connections, Smithy and self decided to hand-pump gas from main tank to gravity, and now find we have seven hours' gas left. We'll make it now O.K.

10.22 A.M. Thirty hours in the air. Altitude: 800. Speed: 75 knots. Revs.: 1,550. Smithy has flown about 17 hours and self 13 hours, and both now pretty tired. We had a gruelling last night. Have not sighted anything but clouds since leaving Kauai.

11.22 A.M. Thirty-one hours in air. Altitude: 750. Speed: 76 knots. All O.K.

12.22 P.M. Thirty-two hours in air. Altitude: 800. Everything lovely ahead. It's about time we sighted some land.

1.02 P.M. (11.30 A.M. ship's time.) Shortly after noon ship's time we should know our true Lat. position, and D.R. long., then how far it will be to Suva.

1.10 P.M. Land sighted on starboard bow by Ulm.

1.12 P.M. Islands everywhere in front of us.

2.22 P.M. Thirty-four hours out from Kauai, and here we are sailing along at 2,000 between the smaller Islands and Suva. This is one of the proudest moments of my life. Our only hazard now is the ground at Suva. Will it be large enough? It has taken much hard work and perseverance to reach Suva from U.S.A. by air.

2.30 P.M. (Hon. time.) Raining again as Karo Is. comes into view ahead. Will land in Suva about 3.45 P.M.

3.22 P.M. Thirty-four hours nearer Suva.

3.45 P.M. Only five minutes off now.

3.50 P.M. LANDED SUVA.

Part Four: SUVA TO BRISBANE

CHAPTER XV

HOW THE FIJIAN NATIVES GREETED US. IN A STRANGE LEGEND THEY HOOK THE PLANE TO THE MOON. TIDE AT NASELAI UPSETS OUR PLANS. BEACH-COMBING IN A TROPICAL PARADISE. FIJIAN MAIDENS SAY GOOD-BY.

OUR presence at Suva caused an immense stir among the Fijian population. Thousands of the natives had never seen a plane. They ascribed to us various supernatural qualities, and arrayed themselves in their most colorful raiment, and staged bewildering ceremonies in our honor.

In fact, the natives exalted us to the stature of demi-gods, quite without justification. They flocked in from the cane-fields and the other plantations to see the Wanga Vuka (the bird ship). Down through the ravines from the hills, where palms and deep bronze-green and red foliage rioted, they came, in all the bravery of gaudy sashes and head-dress, that dazzled the eye. Their bards composed ballads to celebrate our achievement, and it was clear that our swoop from the blue had thoroughly stirred the native imagination. They were all ready to help if they could. They were prepared to carry us, or even the "Southern Cross," wherever we willed. We could have had the help of thousands of native volunteers to carry out service of any kind associated with the bird ship.

An illustration of how they exalted us to the elevation of the supermen of ancient mythology was given in a story that came across to Suva from the neighboring islands of the Lomaiviti Province. There the natives had been told that about June 4th we would call at Suva on our flight to Australia, and that we would be passing very close to their island. It had been suggested that our course would be as near as possible to the route of mail steamers from Honolulu to Suva.

On the morning of June 4th, the only European trader on the island told the natives to keep a close lookout for the plane. This they promised to do, and declared, too, that as soon as they saw it they would come to his house and tell him that the plane was in sight.

A great crowd of natives came hurrying through the trees to the trader's home on the morning of June 5th. Their faces were grim and serious. They had the puckered brows and the wide-open eyes of people who had been astounded at some amazing sight.

"My word," Turaga said, their spokesman, "we did see the aeroplane last night. It was a wonderful sight, did you not see it, too?"

So did their trader interpret their message. He told them he had not seen the plane, and expressed displeasure at the fact that they had not attempted to call him to see it.

"Yes, we should have called you," Turaga, the native spokesman acknowledged, "but we became so excited that we forgot to call you. It was a wonderful sight to see his plane rest over the island. Yes, he actually rested. He must have been too early to go on to Suva, so he stayed for some time over our island."

Here was mystifying intelligence for the trader. He could not understand the native's references to the plane resting. He was intrigued, and decided to accept their story and question them further.

"Yes," Turaga, the native spokesman, said in his own tongue, "and I will tell you how he actually did it, we saw him so plainly. He found that he must be ahead of time, and that he had to wait till daylight before he went on to Suva. So he decided to have a rest, and he went up to the moon and hooked his plane on to the moon. We saw him hook on with the big hooks, and the plane rested there. It stayed there for an hour. Boss, we saw him stay there, true!"

The trader was more mystified than ever. It was clear that the natives had seen something in the sky. It was clear, too, that they certainly had not seen the "Southern Cross" hook up to the moon.

We have heard of the advice to hitch one's wagon to a star, and we knew, too, the fox-trot, "Keep on sweeping the cobwebs from the moon," but we had never essayed either feat.

Certainly the idea showed a fine imagination in the natives. It would have been a boon to us in those squalls that we struck on the night before we got into Suva if we could have flung our grappling iron on to the moon or the tail of a comet for a welcome rest from the storm battering.

But we were not the supermen that the natives believed we were.

The trader pondered over the strange story. Then the solution came to him quite by accident. He discovered in the newspapers that on June 4th there was to be an eclipse of the moon. It was to occur about the time that he asked the natives to watch for the plane.

They had seen the dark shadow on the moon, and had become convinced that it was the "Southern Cross" moored up there to a pinnacle in the moon mountains, swinging lazily on its moorings over the lunar valleys.

It was a most colorful flight of native fancy, but regretfully we had to disclaim the prowess that those swarthy chieftains out there on the hills of Lomaiviti ascribed to us. The trader sent for the natives, and told them that it was not the plane but the eclipse of the moon that they had seen.

They shook their heads in disbelief.

Eclipse of the moon—bah! That was no eclipse of the moon. It was the "Southern Cross" resting quietly on a lunar plateau!

So muttered the old natives, the wise men of the party. They said nothing but they shook their heads, and their eyes showed how incredulous they were of the eclipse story.

Down through the palm thickets they went back to their villages, still fondly cherishing that more poetical vision of the "Southern Cross" clinging to the moon. Anyhow, it was a pity that such a colorful fancy should be blasted.

How our landing impressed the white population of Suva is perhaps epitomized best in the written expressions of it handed to us by an old pal of ours who was one of the party of ex-war pilots who assisted us at the landing. His impressions, graphic to a degree, we found interesting. He said:

"I heard the whirr of her engines. I could not believe that the miracle had come to pass, and that the terrific strain of the past thirty-three hours was ending.

"The 'Southern Cross' swam into sight across the palm-clad hills, flying low down, like an arrow, to her mark. I began to blaspheme. I am a churchwarden, and now I am an old man. I have sunk to that!

"I cursed as I have not cursed in many years of peace. All of us old pilots remembered aerodromes on the Western Front and the waiting for the last late machine, homing after the sunset, and the many gallant fellows who had never come home. The 'Southern Cross' had so nearly not come through that night of storm and cloud.

"Then the landing! Would old Smith and Ulm be satisfied with the feeble preparations, with such a tiny strip of ground in which to land a great monoplane when the pilot's nerves and judgment were worn out by hours of difficult flying?

"Would they curse Suva and us and decide to pancake her down with a crashed under-carriage? She is flying straight towards us—then once around the ground three or four times more. Off he goes with a fine turn of speed—the cheek of the fellow showing us what he can do after a 3,000-mile journey! He'll go round again. No! My God! He is cutting off his engine, he is banking to land. Can he? No! He is coming too far in. He can't do it!

"He will switch on and pick up again. No! His wheels have touched. He's going too fast. God! God! We all cry: 'He'll crash! He'll crash into the fence!'

"We can't catch hold of his wings, they are too high. Come back, Fenton, you fool, you'll be killed. Fenton dashes, a tiny midget, in front of the machine, prepared to die in a vain attempt to save her. She'll crash—the pity of it—to come 3,000 miles and then crash that glorious ship!

"She's into the hill at what a hellish speed. He's turning her. She will go on her nose. He is getting round. What a ground loop! He is around, thank God! He is around!

"What a wonderful effort! He has stopped. He is clear of the fence, clear of the tree by a few feet. Thank God! I never want to see another landing like that, old man; it is too much at the end of thirty-three hours' of waiting."

Natives and Europeans poured into Suva on the morning of June 7th to see us take off for Naselai Beach. The little streets seethed with color and movement. A greater crowd massed about the cricket-ground than the first gathering that had welcomed us on our arrival. Thousands of natives came in from their villages chanting in a weird way the ballad that they had composed that sung the praises of the Wanga Vuka (bird ship). Who knows, but the same ballad may be handed down through Fijian generations like the old epics of the Norse fiords.

We had quite a morning sending and receiving cables and reading the weather reports. Then began the round of farewells, commencing with the Mayor, Mr. Marks, and Mrs. Marks, our kind hosts, and the many people who forty-eight hours before were strangers, but were now our proved friends. Friendship flourishes quickly in hours of stress and strong emotion.

It was slow work pushing through the crowd to the "Southern Cross," which was still guarded by the trusty Fijians with all the fidelity of Horatius holding the bridge. Lyon and Warner stood below the plane with a wistful look on their faces, as if they disliked the thought of our setting out for Naselai without them. Warner started the motors one by one, and they hummed with the same harmony as ever. This time we could hear and acknowledge the volleys of cheering that swept in gusts across the cricket ground. We lifted from a run of 400 yards, and our ears ringing to the good wishes of the Suva citizens, European and native. We were skimming over Naselai Beach almost before we settled properly in our chairs in the cockpit.

In our mood of pining for a speedy departure, it was not a pleasant picture that we looked down upon from over Naselai. Artistically it was wonderful—a tropic beach of wild splendor—a white surf-scoured strand—a coast fringed with dull-green palms and green rollers bursting into foam as they smashed on to the beach.

Actually the picture was distasteful from a practical flying viewpoint. The tide had been driven back by a strong southeast wind, and it was still high on the beach swirling in a cauldron of foam almost up to the line of sentinel palm trees.

The "Pioneer" was obliged to stand a mile off the shore, and the petrol was being sent through the breakers in surf boats.

The whole picture for us spelt delay. Our impatience was growing steadily as we felt that every twelve hours that we lost at a stopping place was detracting from the non-stop element of the flight. This we were most anxious to preserve. We gloomily reflected that had there been a good take-off ground at Suva we would probably at that moment be in Brisbane, and the Saturday night dinner in Sydney would then be a certainty. As things were developing, however, it was fading into the mists of impossibility. There was nothing to do but to contain ourselves for another hour, so we flew back over Suva. In doing this, however, we learned later that we had innocently caused the greatest consternation. Suva feared something had gone wrong.

As we looked down from above the town we saw the Police clear Albert Park and the adjacent roads of people. The crowd was thrown back, and the football posts that had been replaced after our departure were hastily uprooted again. We dropped a message tied to a light cartridge, telling the crowd that everything was in order, and that we were just killing time till the tidal conditions at Naselai became kinder.

After a little aimless flying over Suva we returned to Naselai, and landed on the Beach. Then began the tedious business of fueling in the strangest conditions that we had met on the flight. The big green seas were still rolling in, and the ebbing tide was just seething about the wheels of the plane as it rested on the sand.

Natives with gleaming bronze bodies brought in the gasoline in the surf boats that rode the combers with the same certainty as the club boats on the Sydney beaches. It was slow work getting the gasoline into the tanks of the plane. As the hours passed, the golden day turned to one of ash-gray. The sky became heavily overcast, the wind puffed up with greater force, swinging in at right angles to the beach, and the slow work was necessarily slowed down still more. Four o'clock came and went, and it was clear that we could not get away for Brisbane that day. As the clouds darkened the sun and the great sweep of tropical forest that had glowed in its genial warmth turned to a somber shadowy black, the weather change was in keeping with the change in our mood. In the morning we had been buoyed up with the expectation of winging our way on southwest. Now we were cast down.

As we stood on the beach among the toiling natives our disappointment was keen. We held a little conference there under the palms, and resolved that we could not move from the beach that afternoon. We saw our plans for reaching Sydney by Saturday night crumbling in chaos, and we saw, too, a schedule being disturbed by an unfortunate set of circumstances—a schedule that even the savage tropical storms of the mid-Pacific had failed to shake.

We were a sorry disconsolate crew as we stood there on the Fijian Beach scrawling impatient, meaningless diagrams in the sand. Lyon is a man of the sea, and, therefore, he was superstitious. He raised the sailor's moot question whether it was wise to leave on a Friday. Superstition did not worry the rest of us. We were too depressed even to consider the subject for a moment.

We quailed at the thought of returning to Suva and running the gauntlet of further friendly greetings and toastings. We all felt very tired, and in spite of our discomfiture, when we saw our best laid plans and schedule being upset, the inevitable necessity of staying at Naselai that night was to some extent a blessing in disguise for all of us. It gave us the advantage of a quiet night's rest that pulled us together nicely for the rigors of the Brisbane hop—rigors which we did not altogether expect then, but which were driven home to us later with a vengeance. We were to spend the night on the launch "Pioneer," and we reached it with our clothes sodden after a lively tussle with the combers in a surf boat. Captain Mullens introduced us to hot whisky and a hot bath each, dry clothes and a classic dinner.

We climbed into bed in the little state-rooms, and by nine o'clock we were lulled to sleep by the lapping of the waves against the white sides of the yacht. Jim Warner stayed ashore at Naselai, and had the romantic experience of sitting under a tree in the moonlight and relating our experiences (through a police interpreter) to a circle of eager natives who lay around him on the sand, with their chins cupped in their hands—all agog. Here was a picture that Stevenson would have found delight in—a wireless operator dropped from the clouds after a journey of 3,000 miles holding an audience of gayly decked natives enthralled with his story. It had every embellishment of romance—a tropical moon riding lazily above the island—a beach of purple shadows and the sigh of the surf.

Jim had a wonderful night. He slept in a Fijian village; he drank Yangona, the toasting drink of the Fijians for ceremonial occasions, and was shown the significance of many of the native customs.

Sam Ellis roused us before dawn. The "Andi Beti" was leaving for Suva, and would take our cables and dispatches. We rose, and after an hour's flurried pen-scratching, we were free men.

What a morning it was—golden and genial—probably the best that the tropics could do in the way of mornings. We had hauled the "Southern Cross" up the beach out of reach of the tide, and there she was perched like a horse in a loose box—her nose nestling in the tropical scrub above the high-water mark, and the sea lazily lapping her tail. There was no chance of leaving the beach till the afternoon, so the morning was ours.

We felt a little more resigned to the disturbance of our schedule now. Perhaps it was the languor of the tropical morning that had smoothed out our chagrin.

There we lay on the white deck of the little yacht barefooted. For a few hours we were beach-combers in a lotus land. Mundane things such as newspapers and cables and wireless were forgotten for a while in this world of tall palms and water clear as crystal.

At the yacht's side could be seen the slope of the sand and the gleam of the shells, as through a pane of greenish glass. The sea that morning had a lazy languor, the palms, the sand, everything, had that same air of indolence. It felt good to be alive in such a corner of the world. We exchanged stories there on the deck with our airmen friends, and Fiji, with its tropical ease, began gradually to grow on us.

And what a lunch we faced at noon—steak and onions, Fijian corned beef, tinned Fiji pineapples and beer. It was food for the gods. Our everlasting gratitude went out to Captain Mullens, of the "Pioneer," both for his capacity as navigator and caterer.

But all good things must come to an end. There was still that matter of the hop to Brisbane. So early in the afternoon we sought the shore. For the last time we were carried through the smoking surf pick-a-back by laughing Fijians with the physique of Greek gods. It was good to be back with the ship again.

Among the souvenirs of our stay in Fiji that we carried was a whale's tooth—the symbol for the best wishes possible for a Fijian to pay. It was presented to Smith, in behalf of the whole expedition, by the

THE END OF THE TRAIL

The "Southern Cross" lands at Brisbane, Australia, completing the longest and most hazardous flight in aviation history.

THE RECEPTION "DOWN UNDER"

The crew of the "Southern Cross" leaves the landing field at Brisbane.

oldest living Fijian, Ratu Joni Mataitini, who is a member of the Fijian Legislative Council.

The tide had now receded, leaving behind a crescent of beach firm and white as a new concrete road. A big force of willing Fijian natives surged round the plane, and wheeled her back from the scrub down on to the strand that was smoothed by the plane of the surf.

At last everything was ready for our take-off. As we stood on the beach below the ship, we were made the center of another pretty little ceremony. Down from the great banks of palms and scrub that surrounded the village came a bevy of Fijian maidens, all graceful, all charming. Each of them approached us shyly with a native bowl of Yangona. The chief of the tribe, who led the procession of beauty, insisted that we be accorded the ancient Yangona ceremony to do us honor on our departure. We were deeply touched by this evidence of good-will by the natives. It was in keeping with the spirit of the old world courtesy that had animated the Fijians in their treatment of us during our whole stay on the island. We thanked them as well as we were able by signs and a few interpreted words that were passed on to the chief. The Fijian maidens gave us a broad dental smile—a hero-worshiping smile that should have been an inspiration to any feat of daring. But we did not have any special ideas in daring on the threshold of the last stage of our flight. Rather, were we worried still over that broken time-table, which deprived us of the excellent chance we had of making the distance in three hops in absolutely the minimum time in which it could ever be accomplished.

We said good-by to our European friends, and climbed aboard the "Southern Cross."

What a strange setting was this for the beginning of our third and last big ocean hop.

A long white beach, glittering in the sun, half a dozen white men in tropical suits, a few score of Fijian men and attractive dusky maidens, who wore dresses that flung a further splash of color into what was already a colorful picture.

CHAPTER XVI

INTO THE AIR AGAIN. WE SAY GOOD-BY TO SUVA. DARKNESS FALLS. PROMISE OF EXCELLENT NIGHT'S FLYING. OUR EARTH INDUCTOR COMPASS FAILS.

WHILE the little knot of people on Naselai Beach gave us a parting cheer, Warner cranked the three motors. They warmed up into a steady roar without the slightest tremor. They promised well for us on the third and final stage of the flight. Weather reports handed to us at the last moment were very cheering. They predicted fair winds along our route. There was no mention of any disturbance, and everything looked quite rosy. The beach, which Smith regarded as one of the finest runways that he had seen, was in perfect condition for the take-off. Among the last to whom we bade farewell, and to whom we sought to convey something of the deep sense of gratitude we felt, were Major Clive Joske and Lieutenant Samuel Ellis, who had done so much for us in those two memorable days in Suva.

It was at 2.52 P.M. on June 8th when the "Southern Cross" lifted from the beach with 900 gallons of petrol, after a run of 1,000 yards. We climbed steadily, and in two minutes were looking down on the long white line of seething water along the reef. Our last picture of Naselai was a blue mirror of sea bisected by the tumbled water of the reef. Inside the flashing white line was the tiny Government yacht "Pioneer" that had served us so well. Outside plowing her majestic way to Suva on her trans-Pacific run was the big Union Company's liner "Aorangi." But Naselai and the reef rapidly slid the other way, and twelve minutes after the take-off we were once more sweeping above the white roofs of Suva that gleamed and flashed in the ardent afternoon sun. Down in the streets a throng of people waved flags and handkerchiefs. Many of them stood again in the little Albert Park Oval, above which we had lived three such anxious moments on the day of our landing.

We were all in excellent spirits.

We flew low and waved to the crowd on the beach, and then Smith turned the nose of the ship once more out to the rim of the sea—this time to a flashing genial sea of pale green turning to a vivid turquoise away down the long track that we were to follow.

Gathering speed, we reached 84 knots, and the green island, with its white roofs, its palms, its surf smoke and its unbounded hospitality, faded to a purple bank against our stern horizon, smoky with the sun-haze. The engines roared with the same flawless rhythm, and this time we tried a new method of plugging our ears against those ceaseless sledge-hammer blows of sound. We abandoned cotton wool, and shoved plugs of plasticine in our ears.

As we turned down the last of our long sea-tracks, light feathery cloud drifted high ahead, but the weather outlook could not have been more amiable.

Our first disappointment came when Harry Lyon sent through a message to the cockpit that the Earth Inductor Compass was out of action. This was an unfavorable piece of news. We have no hesitation in saying that the Earth Inductor Compass proved to be probably the most valuable instrument we carried.

Yet it was our own fault that it failed to function on that last stage of the flight. Among the many cable messages that we received at both Honolulu and at Suva, were advices from the Pacific Scientific Company, giving us full directions for the care and servicing of the Earth Inductor Compass. During the battle of getting the fuel aboard at Naselai Beach we completely forgot to oil this instrument. Without any boasting we really think that this was the only mistake that we made during the whole flight.

We flew by the steering compasses. Lyon feared that these were inaccurate, because small metal objects that would affect them had been placed in the navigating cabin. We greatly missed the Earth Conductor Compass and the security it had given us in steering in the previous hops. We are convinced that had the Earth Inductor Compass been functioning we would have hit Brisbane accurately, and would not have struck the Australian Coast 110 miles off our course.

However, the Aperiodic and Steering Compasses practically agreed, and we had no cause for disquiet.

Lyon made desperate efforts in the first two hours out of Suva to fix the Earth Inductor Compass. He kept changing the course constantly to find out what was wrong. It was no use. He reported that it would not function. We then began to fly by the Steering Compasses on 235 deg. At 4 P.M. we were bowling along at an air speed of 76 knots at an altitude of 1,500 feet.

Lyon took our bearings on the sun, and although one compass was still out of order, the Port Radio Generator, which had been a little capricious, was again working well.

The sun slid down through a light curtain of cloud as we rushed on over a sea that with the approach of darkness was turning from blue to a steely-gray. But we were all as happy as we could be. We were on the home-run. Far ahead lay the full achievement of our long-standing ambition.

We were leaving the mileage behind us on our shortest, and to us, the easiest run of the three that spanned the Pacific. Midway about 760 miles from Suva we had New Caledonia as an excellent guide. And the evening was tranquil, though a dead cross wind sifted over the ocean at about seventeen miles an hour. The big drudgery of the flight we considered was over, the grueling 3,100 mile hop to Suva was now history, and it is little wonder that we felt in the most complacent of moods. We faced that ever-receding rim of the ocean with unbounded confidence. At 5 P.M. we had covered 180 nautical miles from Suva, and the plane had averaged the splendid tally of 89½ knots hourly.

Half an hour later the tropic atmosphere was no more. The lazy warmth of the Fijian Seas had vanished. We rushed out of the Tropics apparently into a distinctly temperate zone. The indolent mugginess of two hours ago gave place to a sharp bite in the air.

We could no longer face the Pacific with bare chests in the cockpit. As we sped forward it grew steadily colder, and we were driven back to our fur-lined overalls. Lyon and Warner got back to their sweaters.

At 6 o'clock the sun dipped beneath the horizon away on our beam. It was our last tropical sunset, and it was worthy of the two previous sunsets that had prompted entries in our rough Log Book.

It painted the sky and the light clouds in all the colors of a prism—purples, pinks, crimsons and orange, trailing away to the gray of the night haze creeping up far ahead. As darkness began to spread over the sea we climbed from 1,500 to 3,800 feet again to prolong our period of light and to prepare at a safe altitude for our night flying. The cross wind puffed into the cockpit with a nip that smelt of Antarctic bergs and polar bears.

Yet every indication pointed to a night as amiable as our first night out from Oakland. Behind us now the orange glare of the exhaust pipe spitting fire began to keep us company. As the darkness muffled us closer the flame waxed stronger, and we had entered on what might be termed our third fiery night trail on the wastes of the Pacific. Below us the cross wind kicked up the white crests. At our ears the motors bellowed strongly, and we climbed still higher at 70 knots.

We flattened at 4,300 feet about 6.20 P.M., three and a half hours from Suva. They had been three and a half hours in which we made excellent time. It was perhaps a little too much to ask that the hurtling speed should be maintained. Even though we were all now in our most optimistic mood we did not dare hope for this. We fully expected that the cross wind, which had now lost much of its energy, but none of its Antarctic qualities, would probably swing to a strong head-wind near New Caledonia.

We were prepared for a patch of worrying head-winds beyond that group. Yet we had not faced a night on the whole flight that held such promise of kind conditions. And we never were more disillusioned in our lives than we were only two hours later. But such are the weather vagaries in long distance flying over oceans.

Several times on the flight we were disillusioned about the weather conditions. This, of course, came of rushing across parallels of latitude as we were doing. We had the reports of the weather men with us, but then the expanse of the ocean was large, and it was hard to forecast without error what might be happening out there more than a thousand sea miles off.

When we say that we were disillusioned, we are perhaps employing rather too sweeping a term. We were always prepared to be disillusioned right through the flight. Out between Oakland and Honolulu, where we met the most amiable weather conditions that could have been imagined, we were prepared to be disillusioned about the advices of the weather men that predicted all the benevolence of weather that we met, because we had planned the whole expedition as if we were certain to face the most execrable flying conditions from Oakland to Brisbane that had ever defaced the surface of the Pacific.

Every point was thought out on the underlying idea that savage storms must assail us constantly on those 7,000 miles of ocean. That is where we claim to have secured by patient organization the margin of safety that was with us on each of the hops. Prepare for the worst and hope for the best was our basic watchword. There was no weakening of that policy as we raced on in the gathering gloom that evening out of Suva. In spite of the most encouraging promise of a good night, we were not convinced that the night would have the peace and beauty that our first night in the air possessed.

The tropical seas round Suva were the battleground of many a fierce storm that had gathered and burst almost out of a blue cloudless sky. We were moving out of these seas since sunset, but were moving into a region in which the capacity for sudden and devastating storm was just as great. That angry waste of tumbled water between New Caledonia and the Australian Coast held all the menace of storms of nearly equal fury to the waters further northwest that dozed treacherously in the heavy damp heat.

And so we sped on.

At 6.30 we were rushing through a twilight of purple beauty. The orange flame from the exhaust pipe flung its glow on the fuselage, and we were conscious of the trail of fire astern without even turning to look at it. But the purple twilight was as treacherous as the flat pale-green squares on the Fijian Islands that looked like good landing grounds, but were actually cane-fields, soft and swampy.

CHAPTER XVII

A SAVAGE STORM THRASHES US. NIGHTMARE BLIND FLYING. OUR WORST EXPERIENCE OF THE WHOLE FLIGHT. WE ABANDON NAVIGATION FOR SEVERAL HOURS.

MENACE hung heavy in the air after 7 o'clock. The stars were gone, and cloud curtains the color of ashes flapped wildly across the horizon sky.

A steely glow seemed to flicker along the rim of the ocean. A steady wind slackened, and then began to jolt us with a succession of heavy punches like a boxer seeking to shake an opponent.

It grew colder and colder. Numbness crept on us even in our overalls. Our hands grew stiff with the snap in the air. The moon was swallowed up in murk, and the darkness closed down like a heavy pall. The flare of the exhaust now seemed to expand and punch a hole in the darkness astern. First the wind dealt us what seemed like a heavy right to the wing-tip, and then rocked us back with a smashing left. The section of black sea with dull white foam crests sweeping away towards New Caledonia that we could see through the glass of the windshield steadily contracted. Clouds billowed across the ocean like heavy smoke.

We nudged each other in the cockpit, and pointed ahead. We both realized that we were plunging right into a spell of flying that was going to be especially dirty. As the navigating cabin began to lurch and rock, Jim Warner and Harry Lyon too realized that once again those air antics that were a little mystifying to them were about to begin.

We do not know from what direction the main storm blew up. We were forging steadily ahead, and whenever we plunged into rain bursts at our high speed they always seemed to be rushing straight at us. Perhaps they were surging across obliquely. They might have been abeam, or they possibly were pursuing us at an angle almost astern. We could not judge unless we were being battered by a definite frontal attack by the wind.

So it was that we had no idea of how the storm approached that was to give us our worst night, and that was to batter us many miles from our course.

Visibility shrank from a mile or so to a couple of hundred yards. We were pushing on at an altitude of 4,500 feet, having ascended for our night flying. Firstly a small rain cloud dissolved right in our path. Rain speckled the glass of the windshield, but we successfully got round it.

Then another water-laden cloud flapped us with its fringes. Now the spots of water on the glass before us began to trickle. A third cloud cut down visibility with its dank gray veil, and the trickles on the glass became racing rivulets.

Then, as suddenly as they merged into sharp showers, the rain clouds scattered, the steely glow of the horizon broke through and opened up a dim lane of water ahead of us.

But the gusts gave us no peace. Our wicker chairs in the cockpit rocked this way and that. We rocked on the air hillocks that the confused chopping wind flung up in our path.

And the dim lane of leaden ocean was smothered again in a curtain of gray rain. This time the squall lasted longer, but we tore right through its center.

There was a lull for five minutes, then another gray storm of a towering height aimed the next series of blows at us. The bumps and lurches got heavier, and the rain began to pepper the glass windshield like a flight of pebbles. We could see nothing now.

For ten minutes we flew blind. And how blind! It was what might be termed the ultimate in blind flying.

To look through the windshield was practically the same as peering through glass at a rushing cascade of water. We were enfolded in blackness. Usually, we could not see the propeller ahead. Its speed made it invisible. But now it was wet and glistening in the lash of the storm. Our little light illuminating the instrument board reflected slightly on the steaming glass, and there before us the propeller for the first time in 5,500 miles made its presence known. From the center flashed a glistening disc, the sole relief in the impenetrable blackness ahead.

The rain seethed steadily against the glass, and we decided to try to get above the tumult of the storm. We began to climb from 4,500 feet.

And what a climb!

We left Suva with 880 gallons of gasoline. We had not been flying long enough for this load to be lightened to any appreciable extent. As the motors began to haul the heavy load the wind smote us harder. We lurched and bumped so much that several times we were pitched a few inches above our chairs in the cockpit.

We could not have counted the bumps. They came in a steady succession. Often they were considerable drops and sickening bucks. In effect, the ship bucked her way aloft in intense blackness, and a merciless flogging of rain. We could see nothing. It was 8 o'clock as we steadily pulled up for altitude through the dirtiest patch of weather we had yet met.

Even the tropical rain before Suva showed us nothing as impressive as the rain that disputed every inch of our slow and hard climb to 9,000 feet. It seemed to sweep right at the windshield in a seething stream as if we were flying against a mill race. Now there was not a second's lull, and no respite from those bumps, that got worse with every thousand feet of altitude.

Raking winds jolted the plane constantly. It lurched and plunged and dropped and slid. But always it drove steadily upward. It was the supreme test of engines and skill in blind flying. Again we had lost the world in the thick murk of the storm. We battled on through hissing walls of water. We rose to 7,800 feet, but we could not get out of it. The plane bucked so wildly that it became difficult to control.

As we flattened out the assault of the stream of water was too much for the glass windshields. They began to leak near the joint under the wing above us. First came a steady drip of water on to our knees. Then the drip became a shower, and often a cascade, till the pants of our overalls became sodden. The water poured down into our boots, and we faced more miserable hours. Our feet became thoroughly wet, and our legs got numb with the intense cold and dampness. As we tore through the rain and darkness the cold became merciless. The blasts that

TAKING OFF FROM BRISBANE

Starting out on the final leg to Sydney, rather an anti-climax after the previous day's battle with the storm.

TIRED BUT HAPPY

Warner, Ulm, Kingsford-Smith and Lyon photographed upon their arrival at Sydney, Australia.

puffed round the edges of the windshield and slapped our faces, which were already streaming with rain water, seemed as bitter as any whiff from Antarctic floes.

We passed through an hour of intermittent dim light and the blackest of blind flying. It seemed like three hours. For perhaps a mile we could see a little through the blur of rain on the windshield. The picture was usually a somber patch of sea, where the white crests seethed far below. Then once again even that cheerless picture was blotted out into black nothingness. There are various degrees of blind flying. In our earlier experiences on the flight we ran into patches when we had to fly blind through cloud banks.

In the daylight hours this meant plunging through a blank unsociable grayness. That was not so bad. We always had the feeling that once we succeeded in, so to speak, puncturing a cloud of this kind, we would emerge into tolerable visibility.

But blind flying at night was a vastly different proposition. It took on all the somber character that our "ghost" plane assumed at night. By day the ghost plane was a thing of beauty drifting across the cloud banks washed by a film of colors gay as a rainbow. At night it was but a grim black cross, often rendered more vivid by a peculiar cold white light that etched its edges against the rolling cloud billows.

So it was with blind flying. By day it seemed as if we were driving swiftly and steadily through impenetrable hardwood smoke. By night there was no world. There was no grayness of hardwood smoke, but an unsociable forbidding blackness. It closed in in a suffocating way. We felt that the plane was racing through the pitch blackness of some never-ending mine gallery or a tube railway with every light quenched. We could do nothing but sit tight, hang grimly to the controls, and keep the nose of the "Southern Cross" pointed unswervingly in the direction which the instruments there under the glow of the tiny electric lamp, and nothing else, told us was straight ahead. If our senses told us that we were banking steeply and we began to feel a heaviness in the head that we believed came of a lurch to one side, we had to disregard them. No wavering was permissible. We had to be ruthless with our own senses. Often we might have a feeling that we were dropping steeply. But the altimeter there in the weak light before us declared emphatically that we were climbing. When it did, we *were* climbing, and by no possible calculation could our sensation of descent be supported.

Thus we plunged on through the dead blackness flouting our senses and disregarding our own brains.

It was infinitely worse than flying through the ordinary darkness of the night. Then at least we could catch a glimpse of the dark sea and the plume of flame from the exhaust glowed strongly in clear air and flung its reflection on the long blue fuselage of the ship. But now we were tearing through a sodden super-darkness. It seemed smothering. In fact, at times, the wild thought flew through the mind that it was actually solidifying round us, and that we were being pent up in the same way as in a mine gallery that was sealed by a slide of earth and stone. Of course, nothing of the kind was happening. The air was basically as untrammeled by anything really more solid than thick rain, as it would have been had it been a cloudless night. But that rain was fierce and relentless. Had we been stationary or moving slowly it might have lost half of its lashing power. But we were rushing at the walls of rain at 85 knots an hour, and the force with which it struck us was increased by that velocity. Possibly that rain was not abnormal, but to us it seemed a deluge the like of which we had never experienced in our lives. It was soon after 8.30 P.M. that the storm leapt on us in its fullest fury. One after another rainstorms charged at us. The battering on the windshields increased. There was no lull. We flew in a black void.

Before 9.30 P.M. we spent several periods of fifteen minutes flying blind. The haulage imposed on the motors in the steady climb with our load was probably their most severe testing. We gradually pulled up a wayward jolting, bucking ascent to about 9,000 feet. There we expected respite. We had visions of breaking through this blinding crust of storm, as we had done on the flight to Suva when rising above dissolving nimbus clouds we had emerged in the blue vault with the Southern Cross constellation glittering high above us.

But history did not repeat itself on this occasion. We struggled to 9,000 feet, but there was no blue vault, no clear air, no jovial moon. At 9,000 feet the whip of the storm was just as merciless as it had been at 2,000 feet. The windshield still streamed with water. The cascades still splashed down on our legs and feet, and the bite of the cold air was more keen. It had been heavy climbing. The machine had come out of one bad bump just to bound and lurch into another. We were as often off our chairs as on them now, and Warner and Lyon were badly shaken up by the sudden dives and slides and jolts of the little navigating cabin.

It was no use. We realized that the bank of the storm seemed to have an abnormal thickness. It was futile to seek to climb above it. There was no doubt that it had a boundary up there somewhere, but we gave up the idea of trying to find it. The machine, though it stood up to its solid work in a splendid way, began to swing and lurch by the very strain of the steady and arduous climb. This was nothing unusual or particularly disturbing. It was inevitable. With such a solid load on that nightmare climb through the blackness it was only to be expected that the ship would begin to pull and swing and become harder to control.

So we flattened out and pushed straight into it like a boxer who charges with his head down into a battery of punishing blows.

It got so cold round 10.30 P.M. that the motors began to lose revolutions. The instruments showed a slight but consistent decline. This was a little worrying. It was a development that needed swift action to counteract. We opened the throttle wide to keep the motors warm.

We began the plan of diving the machine. In these dives through the rain and blackness we often touched a speed of 105 knots. The bucking of the plane in the bad bumps got so bad for a time before 11 P.M. that it took the combined strength of both of us to hold her level. Like a battle cruiser in a big naval engagement, our safety lay in high speed. It meant a more certain control of the plane as she charged at the air hillocks and depressions through which at a slower velocity she would have bumped heavily with added strain. It meant, too, that the motors were receiving their much-needed warming, and the decline in revolutions was definitely checked.

Our hands were so numb now that we had to abandon our entries in the Log Book. Thus is explained the great gap in the log from 6.15 P.M. to 11.07 P.M. In the face of the relentless battering by the rain we tore into dives at 100 knots, and plunged down through a wilderness of darkness and swishing water. As we flattened out again, or to put it more correctly, as our blind flying instruments told us that we had flattened out again, lightning in a rending flash cut open the night. It flickered far ahead, and just for a second showed us great tumbling cliffs of black cloud that seemed to be jostling in a breathless race nowhere. It was a sight that would have filled the man unused to flying with awe. We had planned on the basis of the worst possible weather, and now as we sat huddled in the cockpit peering through the rivers of water that scampered down the glass of the windshield we were glad that we had organized definitely on the pessimistic view. It could not be much worse than the storm thrashing that we were forging against.

Bump followed bump, and Lyon and Warner, lurching about the navigating cabin, flung from their chairs, began to ask what it was all about, what we were trying to do, where we were going, and how long was the pummeling of the storm likely to last. Again the lightning ripped a hole in the clouds, revealing again the heavy smoke-like masses that were already pouring oceans of rain on us, and seemed capable of drenching us steadily till morning. The storm was highly electrical, and when the lightning rent the cloud banks for the moment, our beacon—the orange plume of fire from the exhaust paled to a white glimmer. As the lightning vanished and blackness fell about us once more the comforting tongue of fire again spat defiance to the rain and the murk. By a slight flicker on the streaming glass of the windshields we were always conscious of the play of this exhaust flame beside us.

But towards midnight we saw a flicker on the glass that was not the waning reflection of the exhaust. A crackle of blue flame played a little eerily round the plug leads on all three motors.

This was anything but a comforting relief to the inky darkness. It held a certain amount of risk. The constant drenching of the engines and the heavy electrical charge in the air had caused these spurts of blue flame from the plug leads. There they flickered and waned, splashing the glass with sickly splotches of light, and revealing even more vividly than our tiny light at the instrument board how consistent and heavy was the rain.

Midnight, too, brought a new visitation. It originated directly from the flames that the plug lead spat out. Their glow was flung on to the propeller out there in front of us. The propeller was glistening with rain, and its whirling blades picked up the blue glow, and, in effect, wove it into a great disc of glistening radiance. There the disc flickered before us for nearly an hour, expanding and contracting mistily. It was an uncanny sort of picture, that aura of light blazing out in front of the windshield. It certainly did not blot out our view of anything, as there was nothing to see, and visibility was hardly two feet.

From 9.30 P.M. until nearly midnight we had been flying blind practically without more than ten minutes of relief, and then the relief was only a temporary easing in the force of the rain. It was in no sense a break in that wall of blackness that wiped out the sea and the world, and cut us off from everything.

The blue crackles from the plug leads continued to flicker there, and to preserve that disc of ghostly light in the orbit of the propeller. This no longer interested us. We began to reflect on the condition of the magnetos. And those reflections were not reassuring.

Were the magnetos thoroughly wet?

If they were would they hold out or quit at a critical moment?

This was the gloomy line of thought in which we indulged for a time as we held grimly to those controls to keep the plane level. But the conditions did not help coherent thought of any kind. The ship plunged and bucked and dipped as wildly as ever. Often, as we nudged each other, and pointed to those rather disturbing blue spurts of flame from the engines, we were pitched from our chairs, and found ourselves sitting in air and grabbing wildly for the chair arms.

We kept the throttles wide open to keep the revolutions at a high and safe figure, and to ease the blows that the erratic wind was dealing us.

We did not know where we were in that black void.

It was quite futile to seek to find our position by the instruments, circling, plunging and climbing, as we were. We abandoned navigation during those three nightmare hours. Harry Lyon was just jolted about the navigating cabin. He said later that the roof often seemed to be round his neck "some place."

It would have been impossible to determine where we were or how far off our course we might be during those three hours of "stone-blind" flying. We just concentrated on the stiff task of keeping the ship level, easing the strain as much as we could in the bumps, keeping the engines moving as lively as possible, and, in short, keeping the plane in the air.

It was just a case of hang on and keep going on the very reasonable assumption that the atrocious succession of rainstorms and raking winds could not last forever.

CHAPTER XVIII

STORM'S FURY WANES. WE ARE OFF OUR COURSE. COLD, CHEERLESS DAWN. SPEEDING FOR THE AUSTRALIAN COAST. TRANSFORMATION.

IT was about midnight when the main storm had spent its fury, or perhaps, to put it more correctly, when the plane had succeeded in bursting through it and leaving it behind.

We descended to 4,400 feet still in inky darkness, but with the rain easing to a fine drizzle. It was easily our worst night in the air. We came out of the big storm at a speed of 70 knots. The flickers of blue flame from the plug leads had now ceased, and the cold white disc of light described by the whirl of the propeller was no more. Our minds were easier at this, and at the fact that in spite of the heavy hauling that the engines had to do in the storm, they were running with the same reassuring precision.

The magnetos had stood up to the assault of the rain, and were still working well.

For an hour we were jolted by another bunch of severe bumps. We still had no chance of picking up our position, and these bumps that perhaps were the forerunners of another storm checked any tendency we may have had to congratulate ourselves on having beaten the worst of the night's weather.

At 1 A.M. visibility closed in again, and another nasty rainstorm lashed us. This time, however, our gasoline load had been lightened by the climbing and the rigors of the earlier flying. We began to fly round the rain belts, and to climb above them.

This dodging became arduous, and cut down our progress inevitably. Curtain after curtain of rain swept up at us, and the wind chopped and jolted, alternately tugging and punching the wing. We were tilted and plunged sideways. Then followed sudden dips and bounds that made it hard for us to keep in our chairs at all. But the rain was definitely lighter, and as erratic as it was, the wind was not as boisterous as it had been in the savage storm before midnight. We had several more patches of blind flying, but they were short lived. First we climbed steadily in search of that possible laneway that might lead us out of the incessant bursts of rain.

Up and down we went, but could not find an opening into any clearer conditions. Visibility certainly improved for half an hour or more round 2 A.M., and we shook off the clinging rainstorms. Yet we had not flown much farther when new rain clouds drifted down the sea into our path. Rain once more streamed on the glass of the windshield, and trickled over us in the cockpit.

Three o'clock saw us still scurrying out of the way of the rainstorms that dogged our path. In the higher levels the cold was still intense, but at 1,500 feet we noted a definitely warmer air stratum. Several times when the rain stopped and the cloud wreaths were torn asunder by the wind above us, a star winked far up in the black vault. These slight breaks in what we chose to call the "dirty stuff," led us to believe each time that we were definitely through the belt of wild rain and equally wild wind. Yet, inevitably that heavy black curtain would come sweeping over the surface of the ocean hanging very low, and bringing new splashes of rain of varying intensity. With these curtains, too, came the bumps and slaps and punches against our wide wingspread.

It was still heavy going.

A sorry-looking crew we were as we came down to 1,400 feet for fuel economy somewhere about 4 o'clock in the morning (June 9th). The elements seemed to have pelted pretty well every kind of ammunition at us that they could call up. Our feet in the cockpit felt as heavy and numb as if they were bound in blocks of ice. Our faces were still streaming with the water that had cascaded through the chink in the joint of the windshield. It had trickled down our necks, and from the waist downward we were sodden. Our limbs were stiff, and our hands were numb and slow of movement at the controls.

It had been a fierce night. No other word adequately described it. At 1,500 feet at 4.30 A.M., however, we seemed to have definitely broken that spell of the tempest that hung over us for so long. The dark clouds that lifted now from the surface of the sea looked a little more stable than the constant procession of dissolving clouds that had preceded them. The rain stopped, and with its cessation the gloom and haze that had hung along the sea track that we were following lightened a little, and once more we could see the white-crested waves below us.

As the bumps grew lighter and the spells of steady flying longer, we were all composed into a much more amiable frame of mind. The motors roared away with the same vigor as ever. They had come through an ordeal by water that was never exceeded in severity at any earlier stage of the flight, even in that torrential rain that greeted us on the way into Suva.

As we bowled along at an improved speed of 78 knots between 5 and 6 o'clock we felt that we had beaten the series of storms, and that we would not strike much more hostile rain and wind before we sighted the Australian Coast. We were still miserably uncomfortable from the drenching we had received, and although the air was warmer the sky was heavy with rain clouds, and the ocean slopped oilily —a lusterless sheet of lead.

Gradually a steely glow began to pick out the line of the horizon. Morning's paleness crept across the rim of the sea, and our spirits revived 50 per cent. We had cause to feel complacent now. Every mile over that gray waste of waters carried us nearer to the ultimate triumph of our lives, and to home. It had been a grim battle in that last storm, but anything worth having is worth a fight. We did not regret a moment of that struggle in the black rain-soaked void now. We looked back on it as being only one of the inevitable steps to the triumph that we felt was now without our grasp. Half-past six o'clock came, but brought no lightening of the dreary rain clouds that made the sea look desolate. The paleness along the horizon expanded, and before 7 o'clock there was a break in the clouds. Their ragged fringes lifted, and we were in a position once more to seek our bearings. For four hours in the storm we had completely disregarded navigation. We were content to push on into better conditions, and then we only had to steer due west by compass and we could not fail to pick up the Australian Coast.

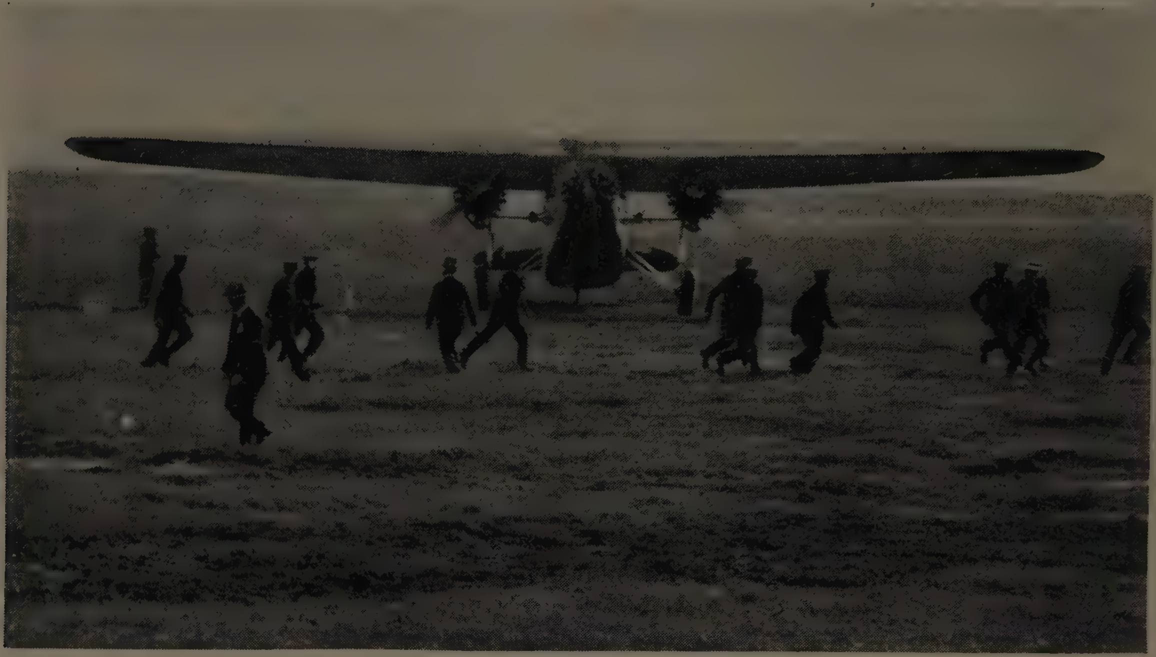
Between 7 o'clock and half-past, as dawn was spreading over the ocean, Jim Warner tried to pick up a radio bearing from Brisbane. Lyon took a sight, and we altered our course to 270 degrees due west. As we had fully believed, in the storm we had blown many miles from our course. This was now not such a serious contingency, as it would have been when we were making what the critics chose to call a long shot at a dot on the map (Fiji). To have been blown off our course then would have made us think hard, but now we had a 2,000 miles coastline ahead and due west.

Yet, it was our plan to steer direct for Brisbane, and any landing on the Australian Coast other than at the Eagle Farm Aerodrome, five miles from Brisbane, we considered would have detracted somewhat from our ambition, just as a delay of, say, a week at Suva would have been a distasteful modification of our original idea.

The story of our grim struggle in the storm was told to the world in a laconic way by Jim Warner on our radio instruments. Twice in the later afternoon Jim had sent out messages that forecast our complete success. He told the world by wireless of our eternal debt of gratitude to Captain G. Allan Hancock, of Los Angeles, without whose generosity we could never have undertaken the flight. We also sent out to the radio listeners in two continents an expression of our thanks to other friends who had helped us,

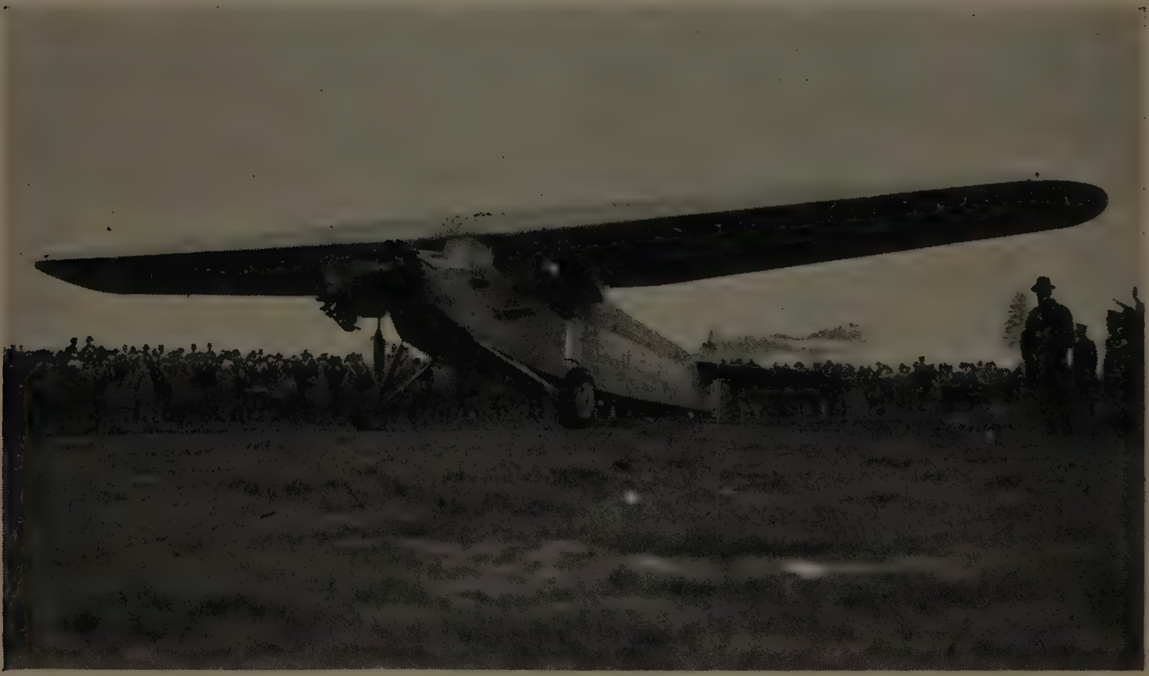
HOPING FOR A SAFE DESCENT

A portion of the crowd, cheerful but anxious, as it awaited the landing of the "Southern Cross" at Mascot Aerodrome, Sydney.



THE POLICE CORDON AT SYDNEY

At considerable risk of life and limb members of the Sydney Police Force rush to form a protective cordon round the still advancing plane.



THE GREAT BIRD COMES TO REST

The "Southern Cross" at the moment of landing at Sydney, the end of the final stage of its triumphal battle with the elements.

especially Mr. Sidney Myer, of Melbourne, who at the time was in California.

Later, Warner asked the Governor of Suva (Sir Eyre Hutson) to convey our grateful appreciation to the Mayor (Mr. Marks), to Captain Samuel Ellis, Major Joske, and all others who had helped us at Suva. In the following three messages the world was told in the most concise form possible of our fight with the storm. Those three messages of Jim Warner's are worthy of reproduction. They speak for themselves. They were:

"6 P.M.: Going well. Breeze light from the east."

"7 P.M.: Bad weather. Will call again."

"8 P.M.: Blind flying."

An hour of transformation—that was what the hour between 7 and 8 o'clock on the morning of June 9th was for us. The ashen rain clouds fell away far astern, and we found ourselves speeding due west through a bright clear morning.

We had descended from 1,600 to 1,000 feet, and slipped along at 74 knots over a sweep of deep blue sea that flashed in the sun like a floor of jewels.

We were rushing on to the greatest moment of the flight.

CHAPTER XIX

WE SIGHT AUSTRALIA. TOO FAR SOUTH. WE STRIKE THE COAST NEAR BALLINA. LANDING AT EAGLE FARM. WONDERFUL RECEPTION. SYDNEY'S IMMENSE CROWD.

WE peered through the glass windshield with a new interest from 9 o'clock. For a long time it seemed the rim of the ocean remained just that and nothing more. The motors were droning now with quite a merry note. Their roar no longer worried our ears. Ahead somewhere along the rim of the sea, and possibly along the whole rim as far as we could see, lay our goal. We were on the threshold of triumph. All the rigors and the anxieties of the flight—the blind flying, the cough in the engine, the caprice of the radio and the compasses were now forgotten. We were nearing home and the completion of a job that we had longed for years to complete.

As the minutes passed, our eagerness, and perhaps impatience, grew. That goal of ours had not yet showed up. The sun had warmed the air, and our numb hands came to life again. Our dead, icy feet, however, remained dead. Lyon set himself to take a sextant shot. He was anxious to secure a longitudinal sight.

At that moment our long vigil through that glass screen was at last rewarded. It was exactly 9.50 A.M.

A vague grayness seemed to merge with the cobalt blue of the sea far on the western horizon.

At first it hung there—a long gray shadow blurring the clear-cut rim of the sea. It did not lift in ragged fringes of cloud.

It was not cloud.

With each mile—and the motors were now giving us a splendid home-run speed of 75 knots—the vague grayness assumed more definite form.

It was land!

We felt disposed to yell.

We nudged each other in the ribs and pointed—all smiles to the gray shadow that was now a darker gray, and seemed to be slipping steadily across the intervening expanse of sea towards us.

"Bully," said Lyon and Warner, as they solemnly shook hands in the little navigating cabin.

Now the gray shadow began to unroll itself as far to the north and the south as the eye could see till it lost itself somewhere in the distant haze.

But right ahead of us the shadow grew in stature. It became solid and turned from that indefinite grayness of no special shape to distant violet hills.

It was the Australian Coast!

We nudged each other in the ribs again, all smiles, as the purple hue left the distant hills and turned to a deep bronze-green when brown cliffs sprung up from the sea.

Now we wanted to yell in earnest. It was no use. The voice of the engines was too strident for any such celebration.

The deep bronze-green grew paler. The brown cliffs grew out of the sea till they showed the long seething ribbon of surf.

But where were we? We were home—but where?

We saw nothing that looked like Moreton Island that was our guide into Brisbane. We were the rediscoverers of the eastern coast of Australia from the air, but we had first to rediscover our own whereabouts. This, however, did not prove to be difficult.

We swung in over the beach right above the fair-sized town of Ballina, 110 miles south of Brisbane.

Battering by the storm the previous night, combined with the fact that the Earth Inductor Compass had been out of action for the whole 1,508 miles of the last hop, were the factors that caused us to strike the coast 110 miles from Brisbane.

Our calculations that the storm had definitely blown us off our course were proved to be correct. There was nothing dismaying about the margin of the divergence from the course, seeing that for from four to five hours, between 9 P.M. and 2 A.M., we had suspended all attempts to pick up our bearings or to navigate the ship. Our only aim was to hold the machine level, and to keep her in the air.

We turned north from Ballina and sped up the coast towards Brisbane without landing. Below us stretched the long line of surf, and the seething of the big green rollers of the Tasman Sea as they burst on the sands and round the cliffs.

It was 10 o'clock when the glistening iron roofs on the southeastern of the Brisbane suburbs swept into view on the tumble of low hills over which they are spread.

Our first Australian goal was in sight.

The chill had now left the air, and Brisbane flashed and glittered in genial sunshine as we picked up the sinuous ribbon of Breakfast Creek, and beyond it the two iron hangars of Eagle Farm Aerodrome winking like heliographs in the sun. Standing out boldly as we flew abreast of the city was the tall steel latticed aerial of the Queensland Government Radio Service that had spoken to Jim Warner in the dismal dawn a few hours earlier.

Eagle Farm is skirted on the west by a big bank of bronze-green scrub. As we flew over the fringe of this in describing a wide circle above the aerodrome we looked down on an army of 15,000 people ranged round the aerodrome in a vast semi-circle. Many of them had shivered since 3 A.M. in the most crisp frost that Brisbane had experienced in the year. Until late the previous night Brisbane had waited anxiously for messages from our radio. Seven planes had flown south down the coast to meet us after we had been reported over Ballina. The Controller of Civil Aviation (Colonel Brinsmead) flew in one of them, and we learned later that our movements had been picked up and passed to the broadcasters by Captain Brain, the Director of Quantas, who was in charge at Eagle Farm, Quantas, of course, being the word coined from the first letters of the title Queensland and Northern Territory Air Service. Our actual time in the air was 83 hours 11 minutes up to our landing at Eagle Farm.

To realize the magnificent reception that Brisbane gave the "Southern Cross" it is interesting to recall the word picture of the preparations for our arrival that was written by an observer on the spot, the Special Representative of the "Sun," Sydney.

"It is a long time since Brisbane has been so stirred by any event," this observer wrote. "The northern capital takes life in a casual sort of way for the most part, and no flight has so gripped the imagination of the people as the present one. It was the idea, the vision in the public mind of the sudden swoop of the 'Southern Cross' out of the blue gray vault over the boundless Pacific that set Brisbane pulses beating faster. Brisbane rose much earlier than usual this morning, and a huge fleet of private cars and taxi-cabs rushed the crowd to Eagle Farm. Many fashionable parties went on to the aerodrome after late dances.

"In the gray light of dawn amid spirals of floating river mist, a long line of cars whirled along the river road to Eagle Farm. Never has that tranquil avenue of tropical trees seen such a tumult of traffic. Out past the ghostly craft looming through the river fog tore this petrol procession. On past dozing gardens and silent ferry wharves raced a crowd that was astir from dawn. Under the aristocratic heights of Hamilton, one of Brisbane's fashionable suburbs, swept that rush of cars, a rush such as Brisbane had not seen before.

"Ghostly figures clustered round the hangar in the dim light. Planes were wheeled out and tuned up, their wings looming eerily in the morning mist. The aerodrome shook to the thunder of airplane engines as the welcoming planes one by one tore across the green carpet and turned towards the ocean."

A most flattering reception awaited us. In their excitement the cheering crowd nearly overturned the pine barriers that the police had flung round two sides of the aerodrome. Police control of the surging waves of people, however, was so efficient that we never feared for the safety of the plane. As we glided down on to the aerodrome far out from the hangars at 10.13 A.M. a police inspector raced across and faced the exuberant crowd that strained with impatience behind the white wooden barriers.

"Get back," he shouted. "This is no ordinary plane," was the awesome warning that he shouted at the people. One of the things that seemed to impress the Brisbane crowd was the size of the monoplane and its great wingspread.

Again our heads were a little dazed from the pound of the engines as we taxied the plane up to the official enclosure. But we did not suffer from the same stone deafness as had made us look perhaps a little foolish at Suva. We could hear the voices of the Governor of Queensland, Sir John Goodwin, and the Premier (Mr. McCormack), but not well.

We stepped from the cockpit into a surging press of people, who all seemed to want to shake hands with us at the same moment. A lady broke through the crowd and decorated Kingsford-Smith with a garland of roses. Then we were swept off our feet, and carried shoulder high to a motor car before the Quantas Hangar. Lyon and Warner hung back when the first few words of welcome were being spoken. They had slipped from the little door of the navigating cabin so quietly that a proportion of the crowd, looking, doubtless, for overalls and flying helmets, mistook Harry and Jim for a minute or two for part of the official welcoming party. Then as Jim Warner hauled down from the navigating cabin his straw panama hat, the jostling mass of people realized their mistake.

There was no other hat like that in Brisbane or in Australia.

Warner and Lyon were at once surrounded by a cheering crowd that yelled "Good old Yanks." They were lifted from their feet, and in thirty seconds they were swaying on the shoulders of enthusiastic citizens just as we were. Some one saved our lives by handing us a packet of cigarettes, and in a car with a big bodyguard of police constables standing along the footboards we were driven in procession round the aerodrome. The enthusiasm of the crowd was intense. We were all deeply touched by the sincerity and warmth of the welcome that was given us. Nearly 5,000 motor cars were parked about the hangars, and these now began to give us as raucous a welcome by klaxon horns as it was possible to hear.

We were driven across towards the Ascot Racecourse, and through to Brisbane by a route that avoided the threading of this jungle of cars which were wedged in such a solid jam that it took three-quarters of an hour to get them all on the move back to the city.

Great as was our welcome at Eagle Farm Aerodrome, an even greater one awaited us in the City of Brisbane. As the cars swung through the suburb of Breakfast Creek, and threaded their way into Queen Street, an amazing sight met our eyes. All Brisbane, we were told, had stopped work at the most busy hour on a Saturday morning to greet us.

Girls from the big drapery stores and typists from city offices all rushed out into the street to cheer us. Our car, and the cars of the official welcoming party, began to thread their way through a packed lane of cheering men and women and girls. Right through the city these volleys of cheering crackled along each block, and it felt good to be home again.

We were still bewildered by the shifting sea of faces as we moved slowly up Queen Street. Women and girls at several points became so excited with the enthusiasm of the occasion that they dashed in beside the car and threw kisses at us. Some of them would have given us orthodox kisses, had not the police bodyguard been particularly active. Forty thousand people cheered us in the streets.

We were entertained at a Civic Reception by the

Acting Lord Mayor (Alderman Watson) in Brisbane's magnificent new Town Hall, which is nearing completion. We certainly did not make an attractive party as we were begrimed by oil and grease, and still dazed from the concussion of engine racket. Nor were we in a suitable state to respond in adequate terms to the magnificent welcome that the city had given us, or to the kind speeches that were made about our achievement.

The Acting Lord Mayor read a most flattering message from the Prime Minister (Mr. Bruce), which congratulated us on behalf of the people of the Commonwealth.

The Governor (Sir John Goodwin) was kind enough to say that the flight was more than a personal triumph, and it marked as well a new era in aviation.

We were feeling the effects of the strain of the storm the night before, and were very tired. Smith tried to thank the gathering for their expressions of welcome and their kindly references. He told them that it was the fulfillment of the ambition of our lives, and it was also the proudest day of our lives. Ulm and Lyon and Warner were all called on to say a few words in appreciation of the great welcome we had been given.

Then to bed to Lennon's Hotel. We all slept from

1.30 P.M. to 7 P.M., when still in our flying breeches and top-boots we were the guests of the State Premier (Mr. McCormack) at dinner. We were a good deal refreshed by our sleep, and were in a better condition to express our thanks to every one in a more adequate manner. The Premier and Colonel Brinsmead and other speakers expressed their appreciation of our feat.

ACTUAL LOG ENTRIES—THIRD LEG

THE FOLLOWING ARE THE COMPLETE LOG BOOK ENTRIES MADE BY ULM DURING THE FLIGHT FROM NASELAI BEACH TAKE-OFF TO EAGLE FARM AERODROME, BRISBANE.

2.52 P.M. Took off Suva.
Revs.: 1,810. Airspeed: 84 knots.
880 gals.
100 feet first minute.
Flew low back over crowd on beach.

2.55 P.M. Passed over town of Suva—cheering population.

4.20 P.M. Ever since take-off E.I.C. been out of action, and we been trying to fix same. Changing course all the while in endeavoring to find what is wrong. Now flying by steering compasses on 235°. But Lyon fears them to be useless, as small metal objects which would affect them have since been placed in Nav. cabin. We don't blame E.I.C., but feel it may have been inadvertently damaged at Naselai Beach. The E.I.C. is a wonderful compass, and we miss it greatly.

Lyon informs me that Aperiodic and Steering Compass practically agree. That's good.

Revolutions: 1,675. Airspeed: 76 knots. Altitude, 1,500. All O.K.

4.25 P.M. Cloudy above, but looks clear ahead. I suggested to Lyon that he take bearing on Sun if possible and try and check Aperiodic and Steering compasses. We tried new method stopping our ears to-day. We used plasticine.

5.00 P.M. Position—Lat.: 19° 25 S. Long.: 175° 34 E.

180 nautical miles from Suva.
Averaging 89½ knots per hour.

5.45 P.M. Sunset. Port Radio generator running again O.K. Still looks like clear night ahead. One compass still out of order. Speed: 70 knots, climbing. Altitude: 3,850. Revs.: 1,650. Getting colder.

6.15 P.M. Again the Exhaust Pipes are spitting fire. Darkness has set in. Smithy and I both now crawl into our fur-lined overalls. It's quite cold now. Altitude: 4,300. Airspeed: 70 knots, climbing. Revs.: 1,650. One compass still out. This is the best night so far, and we are making good time, but we will strike headwinds after passing New Caledonia.

11.07 P.M. Since last entry, have passed through worst 2½ hours on whole flight. Terrific rainstorm with very violent bumps, sometimes losing 400 feet in one bump, and incessant rain. We rose to 7,800 feet, but could not get above it. Smith and Ulm got very wet. It was a case of fly through it, and plane very difficult to control. At times when Smithy was flying blind the bumps were so bad as to necessitate all the strength of both of us on the wheel. Have been eight hours in air, and Smithy has flown 5½ and self 2½ hours. Will relieve him again now. Altitude now 4,400. Airspeed: 70 knots, and just encountering more bumps, which indicate another storm.

3.20 A.M. For past four hours have been dodging up and down at altitudes between 500 and 9,000 feet. At present at 1,500, having just left several nasty rainstorms, but none of them compared to the first one.

3.20 A.M. It is extremely cold at 9,000 to-night, and when the rain came in on us you may guess we were miserably uncomfortable. 'Tis much warmer down here, and although sky overcast, feel we will not have much more bad weather before the Coast.

7.25 A.M. Warner getting radio bearing from Brisbane now. Sorry so few entries in this Log, but been forced to fly high, and hands too numb to write now.

Alt.: 1,600 feet. Speed: 78 knots. Revs.: 1,560.

Altered course to 270°, being due West. Dawn is just breaking. My feet are like blocks of ice, and I'd give a finger for a smoke. Believe we will sight Aussie Coast within two hours.

8.50 A.M. Alt.: 1,000. Revs. p. min.: 1,730. Airspeed: 74 knots. Visibility excellent. Sun coming up fine. Lyon should soon be able to get a Longitude sight. I estimate will land Brisbane in 1¾ hours.

9.50 A.M. Land sighted ahead. Lyon takes Sextant shot.

9.55 A.M. Aussie Coast clearly defined. Loud cheers. Our goal is in sight. In an hour or so we will have satisfied our ambition to be the first ones to cross the Pacific by air.

10.50 A.M. ARRIVED BRISBANE.

RE-FUELING AT MELBOURNE

Filling the great wing tanks with gasoline for further flights.

THE CREW AT SYDNEY

The conquerors of the Pacific pause for a moment, to mingle with earth-bound mortals.

Part Five: LESSONS AND CONCLUSIONS

CHAPTER XX

WE ARRIVE IN SYDNEY, OUR HOME TOWN. IMMENSE CROWD GREETS US. OUR VISIT TO MELBOURNE. WE FLY TO CANBERRA AND ARE WELCOMED BY FEDERAL MINISTRY.

ON Sunday morning, June 10th, we hopped off from Eagle Farm at 10.15 for Sydney. It was a pleasant run of five hours in glorious Australian sunshine, with the whole crew in the most cheery mood. We sat back complacently, immensely pleased that the job was done, and longing a little for peace and tranquillity and freedom from the roar of those motors.

We expected that a Sunday afternoon crowd of perhaps 15,000 would be assembled at Mascot Aerodrome to greet us. Our ambition to have dinner on Saturday night, June 9th, in Sydney, had just fallen short of realization by only a small margin. We would at least be able to have our Sunday night's dinner there, and we thought ourselves fortunate in view of the possibility of a longer delay at Suva than that which we had experienced.

But what an amazing sight met our eyes as we skimmed over the harbor and the skyscrapers of Sydney. It was more than amazing. It was overwhelming.

It seemed as if the whole of Sydney's million and a quarter people had either assembled at the aerodrome or were on their way there. A solidly-wedged mass of humanity covered acres on each side of the main hangar, and every road leading to the aerodrome was choked with motor cars, and a vast army of people hurrying to the flying ground on foot. It was an immense crowd. Officials estimated that 300,000 people surged into the grounds behind the hangars and the headquarters of the N.S.W. Aero Club. Many people who sought to reach the aerodrome failed to get there, so great was the mass of motor traffic on every road that converged on the aerodrome. And we had expected a quiet little Sunday afternoon meeting with about 10,000 or 15,000 people. In fact, to look down from the cockpit on that shifting ocean of heads that swept this way and that, inspired one with a certain amount of awe. We made a good landing, and in a few seconds were engulfed amid a host of people in a reception that can only be described as volcanic. The cheering was like a tornado, and was a worthy rival of the sound of the motors. In fact there were moments when the waves of sound seemed to swallow up the motors' roar.

We were welcomed officially by the Governor General, Lord Stonehaven, Governor of New South Wales, Sir Dudley de Chair, and the Acting-Premier (Mr. Buttenshaw), the Premier (Mr. Bavin) being ill, and the Civic Commissioner (Mr. Fleming). Then began a dizzying round of welcomes and receptions. We were fêted morning, noon and night in our home city for a month.

Melbourne, too, gave us another wonderful reception. Fully 75,000 people gathered at Essendon Aerodrome on the day that we arrived. There, too, we were received by the State Governor (Lord Somers), the Premier (Mr. Hogan), and the Lord Mayor (Sir Stephen Morell), and various organizations and leading citizens.

On June 15th we flew from Melbourne to Canberra. There, at the Seat of Government, we were received by the Prime Minister (Mr. Bruce) and members of the Federal Ministry. We were given a wonderful welcome, and were entertained at dinner at Parliament House, and on the following evening by the Canberra Branch of the Returned Soldiers' League.

CHAPTER XXI

LESSONS AND CONCLUSIONS ON THE FLIGHT. THE MAGNIFICENT WORK OF LYON AND WARNER. OUR LOYALTY TO TRI-MOTORED PLANES IS VINDICATED. GENERAL OBSERVATIONS.

IN considering the lessons of the flight, and perhaps the vindication of our theories, one point stands out prominently.

No long distance flight over an ocean can be completed successfully without a tremendous amount of luck unless an expert navigator is carried. In fact, in trusting to luck and dispensing with the services of a navigator, an airman is being positively reckless. Of that there is not the slightest doubt in our minds.

We say definitely that without Lyon's skill as a navigator, and Warner's skill as a radio operator, we would never have crossed the Pacific safely. Working together, they gave us a wonderful sense of security in our steering. Yet, their work was carried out at times under nothing short of nightmare conditions. Often it was not possible for Lyon to secure an observation of the celestial bodies; at such moments Warner usually picked up a radio bearing from a ship or shore station. This gave us our position, and Lyon was able then to get his dead reckoning. One of the great lessons of the flight on the navigation side was that it is imperative on ocean flights that the navigator shall regularly keep a close check on dead reckoning.

No matter what happened or how heavily we were battered by the sudden squalls, Lyon kept a check that was simply wonderful. The plane circled and climbed clouds, it twisted and swung at right angles, it dropped under storm clouds, and indulged in many similar antics that were dictated by the state of the weather along our path. Yet Lyon always succeeded in plotting our track, and was able to give us our dead reckoning position when we broke into clear air again. After our stiff tussles with the rain clouds between Honolulu and Suva, he gave us our dead reckoning. It was checked by observation, and in spite of our swinging and diversions from a direct course, it was only about thirty miles out. Without Lyon after we came out of these bouts with the cloud banks and squalls, we feel sure that we would not have known in what direction we were flying.

Another of the striking lessons of the flight was the wonderful help that can be derived from a complete radio equipment on those lonely sea tracks. Every plane on a flight across an ocean should be equipped as completely as we were, so far as radio is concerned. Of course, it is essential that the construction of radio equipment on a plane should be such as to ensure lightness. With us radio was a powerful ally, though we discovered that we should have had more and better power for working our instrument. Jim Warner stayed on duty at his transmitter continuously during the whole flight. His energy and enthusiasm seemed inexhaustible, and his unquestionable skill inspired the greatest confidence. We doubt, too, whether Lyon had more than an hour's sleep during the whole time. They were the big factors in the success of the "Southern Cross."

In quite a friendly spirit many of our American airmen friends criticized the meticulous way in which we prepared for the big flight. Some of them indicated that they thought that we had carried our preparations to a limit that might have been called "too fussy." Our safety measures, which were numerous, provoked most comment. They included such things as steel saws and a water still, that fortunately we had no necessity to use. Several other little devices also were not used on the flight. Yet, we are firmly convinced that the hard work, the time, and the money that we spent on those careful preparations and complete organization helped us immensely to our success. We did not regret the loss of one hour of the time that we employed on that organization. We feel that we certainly could not have kept to our schedule as we did had it not been for the completeness of our preparations.

On the question of plane construction, our advice to airmen who may fly oceans in the future is to design their machine in such a way that the crew will be able to walk between the pilot's cockpit and the navigating compartment. We had an 800 gallons petrol tank in the fuselage. In the light of experience on the flight we believe that it would be far better to have two tanks holding 300 gallons each and a small passageway between them. It would have been very convenient when we wanted to exchange messages, and the same passageway could be used by members of the crew off duty to snatch a little real sleep.

The flight taught us, too, that a really efficient smoke bomb for use in measuring drift in the daytime has yet to be made. We carried water flares for measuring drift at night, and they worked well. But we were not able to find any one in America who was making an efficient smoke bomb—we have not been able to secure one even now—two months after the flight.

We carried with us an ordinary Mariner's Sextant, with an artificial horizon attachment. We feel that much can yet be done towards evolving a special Sextant for air work that is lighter and handier than an ordinary mariner's Sextant.

Our experiences, too, indicated our unshakable belief that three engines are vital on a long flight over an ocean. They give the margin of safety that one engine, however good, never can give. It proved, too, the necessity and the value of thorough testing of every piece of the equipment. Smith had completed 150 hours as pilot in the same type of plane as we used before we set out. He had done 3,300 hours' flying in all types, and the training he did in America to make himself efficient in blind flying was one of our surest safeguards, and a big element in the general success. It may be a sweeping statement to record, but we feel it to be an indisputable fact that nobody who has not had a thorough training in blind flying should attempt a long distance ocean flight.

In concluding this survey of the Pacific flight, we desire to pay the warmest possible tribute to the skill and tenacity of Harry Lyon and Jim Warner. Without their aid we would not be here to write this survey.

And to a host of good friends we wish to express our heartfelt gratitude for their assistance and inspiration during our many moments of severe trial in striving after our ambition. We wish to convey these expressions of gratitude specially to Captain G. Allan Hancock, Mr. Locke T. Harper, Mr. Frank C. Jordan, Sr., and Mr. Frank M. Jordan, Jr., to Mr. James H. Fort, Dr. F. T. Reid, Captain J. McMillan, Mr. R. H. K. Smith, Mr. R. E. Haylett, and the Officers at Mills Field and the Oakland Airport.

In Australia our warmest thanks are due to Mr. J. T. Lang, the former Premier, Mr. H. Campbell-Jones, Managing Editor of Sun Newspapers Limited, Sydney, and General H. W. Lloyd. We particularly wish to thank the Sydney Branch of the Returned Sailors' and Soldiers' Imperial League, who stuck to us staunchly right through. We have to express our sincere gratitude, too, to "Doc" Maidment, an engineer of superlative skill, the man who put the whirl in our Whirlwind Engines. Our most sincere thanks also goes to the public of Australia who subscribed to the many wonderful gifts that were showered on us in recognition of the flight.

THE END

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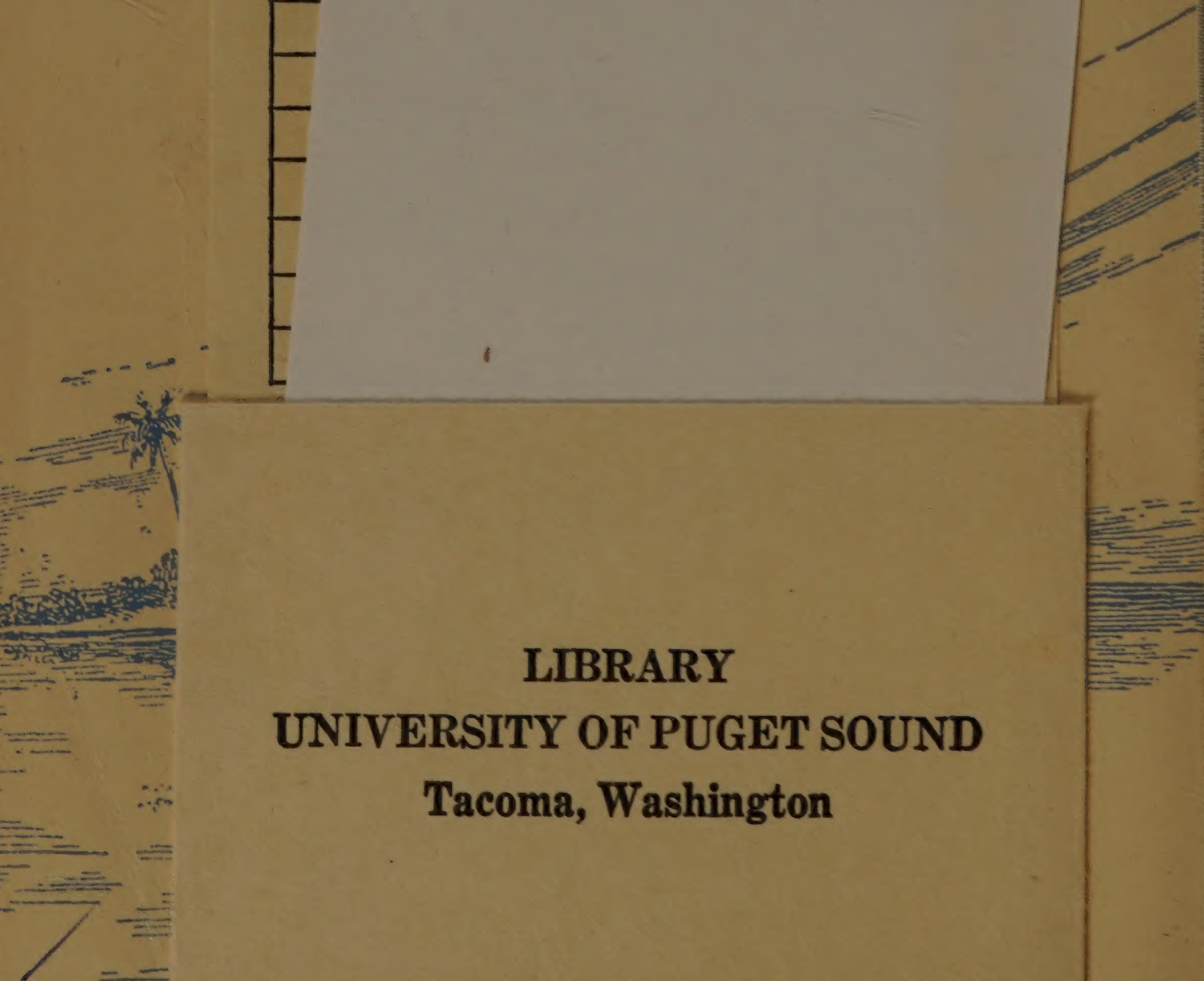

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